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UNITED STATES ARMY
COMBAT DEVELOPMENTS COMMAND

STUDY

ORGANIZATION FOR RADIOLOGICAL SURVEY 1965 - 1970

PHASE III: THE COMMUNICATIONS ZONE (U)

USACDCCBRA 64-8

SEPTEMBER 1966

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ACKNOWLEDGMENT (U)

This Combat Developments Command study was prepared in response to paragraph 122000, Combat Development Objectives Guide.

It will be used as approved guidance within the command for the preparation of future specific studies and the formulation of combat development objectives and concepts relative to U. S. Army participation in radiological survey operations in the communications zone during the 1965-1970 period.

The conclusions and recommendations of this study are those of the Commanding General, U. S. Army Combat Developments Command and are based upon information gathered and analysis performed primarily by the U. S. Army CDC Chemical-Biological-Radiological Agency of the U. S. Army Combat Developments Command Combined Arms Group.

ORGANIZATION FOR RADIOLOGICAL SURVEY, 1965-1970,
PHASE III: THE COMMUNICATIONS ZONE (U)

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ABSTRACT (U)

Organizational and operational concepts, materiel requirements, and communications requirements for radiological survey are reviewed, and developed, as appropriate, for the communications zone in the 1965-1970 time frame based on TASTA-70.

SUMMARY (U)

This study is the final phase of a three-part study which analyzes the problem of radiological survey operations by Army units in a theater of operations during the 1965-1970 time frame. Phases I and II, already completed, considered the problem for the ROAD division and for the RODAC corps and field army, respectively. This final phase investigates the problem for a communications zone (COMMZ) organized under the TASTA concept.

Radiological monitoring and survey operations are required in the COMMZ to ascertain the degree and extent of radiological contamination at or near installations, over supply routes, in areas under consideration for unit occupancy, in cities, and in transportation, communication, and industrial complexes.

Because of its responsiveness, speed, flexibility, and radiation safety, aerial survey should be the primary method of radiological survey in the COMMZ. The capability for ground survey must be retained, however, for use in special instances when aerial survey is impractical. Operational techniques for conducting ground survey are considered to be adequately documented in FM 3-12.

The AN/ADR-6 aerial radiac system is scheduled to replace the IM-174/PD for aerial survey midway in the time frame. Operational, organizational, and logistical concepts for this system were developed in Phase II of this study and are considered valid for the COMMZ. That the Quadripartite AN/ADR-501 aerial radiac set is programmed to be type classified only a few months prior to scheduled type classification of the U. S. AN/ADR-6 should be an important factor in determining US Army procurement needs (if any) for the AN/ADR-501.

With the exception of the AN/PDR-60 alpha instrument, other current dose-rate meters are also scheduled to be phased out prior to 1970. Although a modified version of the Canadian IM-108B/PD (now type-classified as the IM-174A/PD) will supplement the IM-174/PD on an interim basis for ground survey and area monitoring very early in the time frame, the AN/VDR-1 radiac system will eventually be issued as a permanent replacement for both the IM-174/PD and the AN/PDR-27J. A recommended distribution of these instruments to COMMZ units is presented herein.

Late in the 1965-1970 period, the recording radiation monitor and automatic radiation alarm system should be type classified, and one system will be authorized for use at each fixed or semifixed installation within the COMMZ. At that time, the change proposed herein to TA 59-914 should be implemented to provide authority for issue of this system.

The major sources of aircraft for aerial survey operations in the COMMZ are rear area damage control detachments (TOE 29-407D), headquarters and headquarters detachments (TOE 19-76) of MP COMMZ battalions and tactical reconnaissance forces provisionally attached to the area support command. Two AN/ADR-6 aerial radiac systems should be allocated to the utility helicopter team of TOE 29-407D (replacing its obsolete AN/ADR-7 aircraft radiac sets) and three AN/ADR-6's should be provided the aerial surveillance section of TOE 19-76. AN/ADR-6 allocations were recommended for tactical reconnaissance units in previous phases of this study.

Area damage control centers (ADCOC) or the equivalent, located at area support command headquarters and area support group headquarters, will be the central agencies in the COMMZ for the receipt, processing, and dissemination of radiological contamination information. These centers have a mission similar to CO-STAR ADCOC's and require a similar manning level (4 officers and 12 enlisted men). Each ADCOC should have access to a computer capable of performing the automated radiological contamination charting function of ADSAF (Automatic Data Systems within the Army in the Field). In addition, a requirement is justified for the electrical transmission of hard copy radiological contamination charts from ADCOC's to higher, adjacent, and lower echelons.

If requirements stated in the two previous paragraphs are satisfied, the organizational aspects of radiological survey in the COMMZ should be adequate. All units have a monitoring responsibility and can provide survey parties if required. Military police units, rear area damage control detachments, and reconnaissance elements of tactical forces assigned to the area support command will most frequently be relied upon to furnish contamination information.

ORGANIZATION FOR RADIOLOGICAL SURVEY, 1965-1970, PHASE III: THE COMMUNICATIONS ZONE (U)

1. Statement of the Problem. To review and develop as appropriate organizational and operational concepts, capabilities, materiel requirements, and communications requirements for radiological survey by Army units in a communications zone organized under the TASTA concept.

2. Assumptions.

a. Nuclear weapons will be used by friendly and/or enemy forces in future wars.

b. When nuclear weapons are employed, fallout may occur accidentally or deliberately.

c. Radiological monitoring and survey information will continue to be required input for the overall radiological intelligence collection effort.

d. U. S. Army division, corps, and field army organization and tactical operations will be as envisioned in the Combined Arms-70 study during the 1965-1970 time frame.

e. Combat service support within the field army area will be as envisioned in the CO-STAR II study and as modified by TASTA-70 during the 1965-1970 time frame..

f. The structure of the communications zone during the 1965-1970 time frame will be essentially as envisioned in the TASTA-70 study.

3. Facts Bearing on the Problem.

a. Surface and subsurface bursts of nuclear weapons may produce areas of significant radioactive fallout.

b. Persons receiving large doses of nuclear radiation will become casualties.

c. In order to conserve and maximize personnel operating strength, the commander and his staff must be furnished radiological

contamination intelligence at the earliest possible time to be considered in making both plans and decisions.

4. Discussion:

a. Background. This study is the final phase of a three-part study which analyses the problem of radiological survey operations for the 1965-1970 time frame. Phases I and II, already completed, considered the problem for the ROAD division and for the RODAC corps and field army, respectively. This final phase investigates the problem for a communications zone organized under the TASTA concept.

b. Pertinent TASTA concepts. As discussed in Annex B, several TASTA concepts, which differ significantly from current COMMZ fundamentals, have a major impact on radiological survey operations. The COMMZ is not divided into advance and base sections. It remains undivided unless its depth exceeds several hundred miles; division then may occur into a forward and rear support command, similarly organized. The COMMZ is controlled by a theater army support command (TASCOM) which commands five functionalized, vertically-oriented, subordinate commands and a sixth command (area support command) which provides direct support services to the other five. The area support command is responsible for area damage control, to include developing the radiological contamination picture, in the COMMZ. This responsibility is further assigned down to the area support groups. An area damage control center (ADCOC) is provided at area support command headquarters and a similar capability is envisioned at area support group. These ADCOC's are charged with the mission, among others, of receiving raw radiological information. Automatic data processing equipments are available throughout the COMMZ, to include the ADCOC's.

c. Requirement for radiological intelligence. Annex B illustrates the fact that radiological contamination intelligence is required concerning any COMMZ, no matter how organized. Specifically, a requirement exists to ascertain the degree and extent of radiological contamination in the COMMZ at or near installations, over supply routes, in areas under consideration for unit occupancy, and in cities, transportation, communication, and industrial complexes. Radiological monitoring and radiological survey are two of the means available to obtain information for developing this intelligence.

d. Radiological monitoring.

(1) Radiological monitoring is the act of detecting the presence of radiation and the measurement thereof with radiation measuring instruments. Its purpose is to alert stationary units of the arrival of fallout, alert units on the move when they begin

to receive fallout or encounter a contaminated area, and keep the commander informed of the degree of radiological hazard in his unit area. Two types of monitoring exist: area monitoring (spot-checking for radiation at the unit position) and the monitoring of personnel, supplies and equipment. The first type is of primary interest in this study.

(2) Monitoring is included in the routine information-gathering and reconnaissance activities of a unit. Monitoring reports are automatically submitted by a unit when the measured ground dose rate builds up to 1 rad/hour and subsequently after dose-rate fluctuations cease near the peak value and the dose rate begins a general decline.

(3) Deficiencies in the IM-174/PD radiacmeter, now used for area monitoring, necessitate early corrective action. These deficiencies are now being corrected by a planned maintenance program. Further, a modified version of the Canadian IM-108B/PD has recently been evaluated for the purpose of supplementing existing quantities of the IM-174/PD. The results of the evaluation indicated that this instrument is superior to the IM-174/PD, and the modified IM-108B/PD was type-classified Standard A as the IM-174A/PD on 31 March 1966. (Concurrently, the IM-174/PD was reclassified from Standard A to Standard B.) In the last half of the 1965-1970 period, the IM-174/PD (and IM-174A/PD), together with the AN/PDR-27J (current personnel monitor), will both be replaced by the AN/VDR-1 tactical survey meter and vehicular radiac system. As proposed in earlier phases of this study, one AN/VDR-1 should be authorized each TOE sub-unit on a replacement basis for each IM-174/PD or for each AN/PDR-27J already authorized, whichever total is greater. The AN/PDR-60 will be used throughout the time frame for monitoring of alpha contamination. Concepts of employment for these instruments are discussed in Annex B, and their characteristics and time-phasing are enumerated in Annex C. A recommended distribution of these instruments to COMMZ units is presented in Appendix II to Annex C.

(4) Late in the time frame, a recording radiation monitor and automatic radiation alarm system will become available for use at fixed and semifixed installations in the COMMZ. Audible and visual alarms coupled with the recording monitor will preclude the necessity for continuous individual monitoring as required by current doctrine. As indicated in the draft proposed QMR now being staffed for this equipment, one system should be authorized as

installation property to each fixed or semifixed installation in the COMMZ. It is proposed in Annex C that this basis of issue be included as a change to TA 50-914 upon type-classification of the system. Appendix I to Annex C provides the recommended wording of the change. Organizational, operational, and logistical concepts for this system are presented in Annex C.

(5) All TASTA units have a monitoring mission and require the capability of communicating monitoring reports to the area support group ADCOC. In particular, military police (MP) units of the MP battalion, COMMZ, should perform monitoring as a routine part of their vehicular patrols of the ground lines of communication.

e. Radiological survey. Radiological survey is the directed effort to determine the distribution and dose rates of radiation in an area. Since this directed effort usually diverts personnel and equipment from primary duties and functions, radiological survey is conducted only when monitoring reports provide insufficient detail to adequately delineate the contaminated area. As discussed in Annex B, this could occur frequently in the COMMZ, where units are dispersed to the maximum extent practical as a passive nuclear defense measure. In particular, the extent of contamination of complex and lengthy transportation nets and unoccupied areas under consideration for unit occupancy are likely to require survey. Surveys of these areas are the responsibility of the area support commander. Proper planning of installation recovery procedures may require more detailed radiological information than routine monitoring provides, thus necessitating an organized survey effort. Survey of an installation or unit area is the responsibility of the installation or unit commander. Ground and aerial survey are the two types of radiological survey.

(1) Ground survey.

(a) Ground radiological survey may be conducted on foot or by vehicular-mounted personnel. From the standpoint of radiological shielding, surveys performed from armored vehicles are generally preferred.

(b) The IM-174/PD or IM-174A/PD radiacmeter is currently used for ground surveys. As highlighted in paragraph 4d(3) above and detailed in Annex C, the IM-174/PD and IM-174A/PD will eventually be replaced by the AN/VDR-1 for ground survey. A recommended distribution of survey meters to COMMZ units is presented in Appendix II to Annex C. Operational techniques for conducting ground survey are adequately documented in FM 3-12.

(c) All COMMZ units will be capable of providing equipment and personnel for conducting ground surveys, but only at the expense of their primary mission. The ground survey of an installation area, ordered by the installation commander, to augment monitoring information and allow more knowledgeable planning of Phase II area damage control operations is envisioned as the most frequent example. Currently organized rear area damage control detachments (TOE 29-407D) are each provided with a reconnaissance section containing three 1/4-ton trucks and three ground survey meters. This ground survey capability is adequate to conduct effective damage control operations for transportation nets, critical areas, communications, transportation, and industrial centers, and units temporarily without command and control. This capability should be maintained throughout the 1965-1970 time frame. Companies of the MP battalion, COMMZ, may be required to assist in area damage control operations by conducting vehicular ground surveys. One survey meter should be authorized per patrol vehicle in these units. When tactical reconnaissance forces are assigned to the area support command, appropriate elements may provide ground survey data to the area support command ADCOC. Additional details regarding units discussed in this paragraph are provided in Annex B. Annex D recognizes the requirement for these units to communicate with the appropriate ADCOC.

(2) Aerial survey.

(a) It is pointed out in Annex B that the greater speed, flexibility, responsiveness, and radiation safety of aerial survey compared with ground survey resulted in the recommendation in Phases I and II of this study that aerial survey be the primary method of survey in division, corps, and field army, but that a ground survey capability be retained for use when relatively detailed data are required or when aircraft for aerial survey are unavailable. No apparent reason exists in the TASTA communications zone for changing this concept.

(b) In particular, the rapid radiological survey of ground lines of communication (LOC) is best accomplished by aerial means, although ground survey of the LOC by MP vehicular patrols should not be overlooked as a means of supplementing aerial survey data.

(c) The currently-deficient capability for aerial survey results primarily from the use of the IM-174/PD radiacmeter, an instrument highly unsuited for this purpose. As discussed in Annex B, the interim supplement of this instrument by the IM-174A/PD only marginally increases the aerial survey capability. Midway in the time frame, however, two developmental aerial radiac systems are scheduled to become operational. The AN/ADR-501 Quadripartite instrument should be available first. Its faster response time and its chart recorder will somewhat improve the current capability,

but significant changes from aerial survey operational procedures now in use are not envisioned. The AN/ADR-6 aerial radiac system, a US Army development effort, should be type classified only a few months after the AN/ADR-501. This factor will have major influence on procurement needs of the US Army for the AN/ADR-501. The AN/ADR-6 system provides a significant advance over the current aerial survey capability because of its extremely rapid response time, its ability to record ground dose rates by height-correcting the measured aerial dose rates with signals from an absolute altimeter, its ability to utilize existing aircraft data links to telemeter ground dose rates, and its possible ability to utilize automatic navigation devices to correlate ground position and dose-rate data. Operational concepts for employing this system were developed in Phase II of this study.

(d) A review of TASTA organization in the COMMZ (see Annex B) indicates that rear area damage control detachments (TOE 29-407D), headquarters and headquarters detachments (TOE 19-76) of MP COMMZ battalions, and tactical reconnaissance units provisionally attached to area support command will be major sources of aircraft to perform aerial survey. As indicated in Annex C, two AN/ADR-6 aerial radiac systems should be allocated to the utility helicopter team of TOE 29-407D (replacing its obsolete AN/ADR-7 aircraft radiac sets) and three AN/ADR-6's should be provided the aerial surveillance section of TOE 19-76. The tactical reconnaissance forces are identical to these operating under division, corps, or field army control and should already possess AN/ADR-6 systems as recommended in Phases I and II of this study. (These recommendations would also apply to the interim AN/ADR-501, if procured.) There is also a requirement for a digital-analog converter on the ground to digitize the analog output of the AN/ADR-6, making it compatible with ADSAF computer language.

f. CBR data evaluation centers.

(1) An ADCOC or similar capability is envisioned by TASTA at area support command headquarters and at area support group headquarters with a mission to maintain, plot, and forecast information on nuclear bursts, radiological fallout, CB contamination, and other residual effects of mass destruction weapons and natural disasters. TASTA indicates that the ADCOC is staffed with sufficient chemical and engineer personnel to man the center on a 24-hour basis. Although manning levels have not as yet been finalized for TASTA units, the mission statement of the TASTA ADCOC is nearly identical to that of the CO-STAR ADCOC (in the field army support command) which is typically manned by 4 officers and 12 enlisted men, of which 3 officers and 7 enlisted men are

chemical personnel. Assuming that a similar manning level will be authorized for the ADCOC in COMMZ, this center will have the capability to supervise and control radiological surveys and to process input radiological monitoring and survey data into a finished radiological contamination chart or overlay. No other COMMZ organization or element currently envisioned by TASTA will possess this capability, making it imperative that such a capability be provided the ADCOC at area support command and area support group if the requirements stated in paragraph 4c above are to be satisfied (see Annex B).

(2) Recent studies have shown that in a nuclear environment, sustained efficient COMMZ operations may become secondary to survival and recovery of command and control. However, the current manual system of processing raw radiological data into radiological contamination charts is both tedious and time-consuming; this system will significantly reduce the time that ADCOC personnel can spend in interpreting the contamination charts in terms of what area damage control procedures are necessary, when they should be initiated, and in what manner. As indicated in Annex D, this situation supports a requirement for an automated radiological contamination charting function in the COMMZ ADCOC's. A USACDC-approved systems analysis for this function within the field army exists, and a draft Functional Area Description has been prepared for this function. The procedures described in these documents apply equally to the COMMZ and would require a similar computational capability. Accordingly, it is recommended that ADCOC's in the COMMZ have direct access to a computer with such a computational capability.

(3) An analysis in Annex D of the requirements for dissemination of radiological contamination charts indicates that all criteria required to justify hard copy channels of electrical communication for this dissemination are considered to be met.

(4) Figure B-1 in Annex B illustrates the envisioned flow of raw and processed radiological contamination data in a COMMZ organized under the TASTA concept.

5. Conclusions and Findings.

a. A requirement exists in the COMMZ for an established capability which can determine the degree and extent of radiological contamination at or near units and installations, over supply routes, in areas under consideration for unit occupancy, and in population, transportation, communication, and industrial centers.

b. Aerial survey should be the primary method of radiological survey in the COMMZ; the capability for ground survey must be retained, however, for local unit use and for special situations where aerial survey is impractical.

c. An important factor in determining US Army procurement needs for the Quadripartite developmental aerial radiac set, AN/ADR-501, is the availability date of the more sophisticat US Army developmental aerial radiac system, AN/ADR-6. The AN/ADR-6 is currently scheduled to be type classified only a few months after type classification of the AN/ADR-501.

d. Operational concepts for employing the AN/ADR-6 aerial radiac system are given in Phase II of this study (ref 10) and are considered valid for the COMMZ; use of the AN/ADR-501 aerial radiac set (if procured on an interim basis) will not require significant changes to the operational concept for aerial survey now in FM 3-12.

e. Operational techniques for conducting ground survey are adequately documented in FM 3-12.

f. The ground survey capability of currently organized rear area damage control detachments (TOE 29-407D) is adequate for the 1965-1970 time frame.

g. The allocation of ground dose-rate meters proposed in Appendix II to Annex C is required to provide COMMZ units with the necessary ground radiological survey and monitoring capability.

h. The major sources of aircraft for aerial survey operations in the COMMZ are rear area damage control detachments (TOE 29-407D), headquarters and headquarters detachments (TOE-19-76) of MP COMMZ battalions, and tactical reconnaissance forces provisionally attached to the area support command.

i. Two AN/ADR-6 aerial radiac systems are required in the utility helicopter team of TOE 29-407D (or equivalent) and three AN/ADR-6's are required in the aerial surveillance section of TOE 19-76; tactical reconnaissance forces have already been allocated aerial radiac systems in previous phases of this study.

j. TASTA area damage control centers (ADCOC) in the COMMZ at area support command and area support group require the manning level presented in Table B-1 of Annex B for radiological data processing. TOE 3-500 JA teams can be used to augment this capability, if required.

k. The flow of radiological contamination data in the COMMZ envisioned in Figure B-1 of Annex B will satisfy user requirements.

l. Each TASTA ADCOC should have access to a computer capable of performing the automated radiological contamination charting function as described in reference 40.

m. There is a requirement for electrical transmission of hard copy radiological contamination charts from ADCOC's to higher, adjacent, and lower echelons. (See Figure B-1 of Annex B.)

n. One recording radiation monitor and automatic radiation alarm system should be authorized as installation property for each fixed or semifixed installation within the COMMZ; TA 50-914 is the appropriate table of allowances for this authorization.

6. Recommendations. It is recommended that:

a. Consideration be given to the availability date of the US Army AN/ADR-6 aerial radiac system prior to procurement (if any) of the Quadripartite AN/ADR-501 aerial radiac set.

b. The allocation of ground dose-rate meters proposed in Appendix II to Annex C be approved and incorporated into final TASTA TOE's for COMMZ units.

c. Two AN/ADR-6 aerial radiac systems be authorized the utility helicopter team of rear area damage control detachments (TOE 29-407D or equivalent) on a replacement basis for the two obsolete AN/ADR-7 aircraft radiac sets currently authorized, and three AN/ADR-6 aerial radiac systems be authorized the aerial surveillance section of the MP COMMZ battalion's headquarters and headquarters detachment (TOE 19-76).

d. Area damage control centers (or the equivalent) organized for use in the COMMZ at area support command and area support group be authorized the manning level presented in Table B-1 of Annex B.

e. Each ADCOC be provided direct access to a computer capable of performing the automated radiological contamination charting function as described in reference 40.

f. Communications channels be provided the ADCOC for the electrical transmission of hard copy radiological contamination charts to higher, adjacent, and lower echelons. (See Figure B-1 of Annex B.)

g. TA 50-914 be changed as indicated in Appendix I to Annex C upon type classification of the recording radiation monitor and automatic radiation alarm system.

ANNEX A

STUDY DIRECTIVE

HEADQUARTERS
UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND
FORT BELVOIR, VIRGINIA

CDCCD-F 30 October 1963*

SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

TO: Commanding General
US Army Combat Developments Command
Combined Arms Group
Fort Leavenworth, Kansas

1. General: Request that a study be undertaken which will develop "Organization for Radiological Survey, 1965-1970 (U)" in consonance with the general objectives stated in paragraphs 1110b(8)(h), 1210a(3), and 1211b(3) of the Combat Development Objectives Guide.

2. Objective and Scope: To review, and develop as appropriate, organizational and operational concepts, capabilities, materiel requirements, and communications requirements for radiological survey, to include broad concepts for surveying enemy territory, by reorganized Army units in a theater of operations. The study will be conducted in three phases: Phase I, for the Division, based on ROAD-65 organizational and operational concepts; Phase II, for the Corps and Field Army, based on RODAC organizational structure; Phase III, for the communications zone, based on the reorganization structure of the communications zone.

3. References:

a. Letter, CDCCD-F, Headquarters, US Army Combat Developments Command, 14 August 1963, subject: "Study Project USACDCCBRA 64-8

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*As changed by Letter, CDCCD-F, HQ USACDC, 8 November 1963, subject as above.

CDCCD-F 30 October 1963
SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

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c. Final Draft Study CMLCD 59-8, "Communications Requirements for Radiological Monitoring and Survey (U)," US Army CmlC Field Requirements Agency, December 1960, SECRET.

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f. Study, "Reorganization Objective Army Divisions 1965 (ROAD-65), Airborne Division (U)," USCONARC, 15 May 1961, SECRET.

g. Study, "Field Army Requirements for Air Reconnaissance and Aerial Surveillance (U)," US Army Combat Developments Command, May 1963, SECRET-NOFORN.

h. Final Draft Study, "Field Army Aerial Surveillance Systems Requirements (U)," US Army Combat Developments Command Combined Arms Agency, May 1963, SECRET-NOFORN.

i. POIR-2242, Operation Sun Beam, Shot Small Boy, Project 7.6, "Feasibility Evaluation of an Aerial Radiac Survey System (U)," US Army Electronic Proving Ground, November 1962, SECRET-RESTRICTED DATA.

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SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

l. DA FM 30-20, "Aerial Surveillance-Reconnaissance, Field Army," 12 September 1961, UNCLASSIFIED.

m. Report of Test, "Light Observation Helicopter versus Fixed-Wing Aircraft Experiment," US Army Combat Developments Command Experimentation Center, 25 June 1963, FOR OFFICIAL USE ONLY.

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o. Final Study, "CO-STAR II (2nd Rev) (U)," US Army Combat Developments Command Combat Service Support Group, undated, FOR OFFICIAL USE ONLY.

p. Final Draft Study CMLCD 59-16, "Application of Automatic Data Processing System(s) (ADPS) to Chemical Corps Field Activities, Phase II, Part 3B, Radiological Contamination Charting Systems Analysis," US Army Combat Developments Command Chemical-Biological-Radiological Agency, December 1962, UNCLASSIFIED.

q. USACGSC Project, "Command Control Information Systems, 1970 (CCIS-70) (U)," Office, Deputy Chief of Staff for Military Operations, 1 December 1961, CONFIDENTIAL.

r. Final Draft Study CBRCD 63-14, "Marking of CBR Contaminated Areas," US Army Combat Developments Command Chemical-Biological-Radiological Agency, July 1963, UNCLASSIFIED.

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t. Study, "The Army Force Development Plan, 1964-1983 (U)," Office of Assistant Chief of Staff for Force Development, DA, April 1963, SECRET-NOFORN.

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SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

w. Draft Proposed QMR for High Performance Unmanned Aerial Surveillance and Target Acquisition System (U), US Army Combat Developments Command Combined Arms Agency, May 1963, CONFIDENTIAL.

x. Draft Proposed QMR for High Performance Manned Aircraft for Field Army Aerial Surveillance and Target Acquisition (U), US Army Combat Developments Command Combined Arms Agency, May 1963, CONFIDENTIAL.

y. Draft Proposed QMR for the Operational System of the Field Army Command Control Information Systems, US Army Combat Developments Command Combined Arms Agency, 29 October 1962, UNCLASSIFIED.

z. Draft Proposed QMR for an Intelligence Subsystem of the Command Control Information System (CCIS), US Army Combat Developments Command Intelligence Agency, 4 April 1963, UNCLASSIFIED.

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ab. Final Draft Study CAG 63-2, "Visualization of the RODAC Battlefield (VORB) (U)," US Army Combat Developments Command Combined Arms Agency, 15 April 1963, SECRET-NOFORN-RESTRICTED DATA.

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SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

ah. DA TC 101-2, "Tactical Operations Centers," 25 May 1960, UNCLASSIFIED.

4. Assumptions:

a. Tactical nuclear weapons will be used by friendly and/or enemy forces in future wars.

b. When tactical nuclear weapons are used, accidental and/or deliberate fallout-producing nuclear bursts will occur.

c. Radiological monitoring and survey information will continue to be a required input for the overall radiological intelligence collection effort.

d. US Army division, corps, and field army organization and tactical operations will be as envisioned in the ROAD-65 and RODAC-70 studies during the time frame of interest.

e. Combat service support to the US Army will be as envisioned in the CO-STAR II study and as modified by TASTA-70 during the time frame of interest.

f. Army aerial platforms will assume increased responsibility for forward area surveillance during the time frame of interest.

5. Guidance: In accordance with reference 3a, the requirements for Phase I of USACDCCBRA 64-8 will be satisfied by updating the final report of CMLCD 61-1, "Organization for Radiological Survey - Phase I: The Division," US Army Chemical Corps Field Requirements Agency, April 1962, which was submitted in response to an earlier requirement. Unless substantial conceptual changes in this document are required, it will not be necessary to re-coordinate a draft of Phase I.

6. Administration:

a. Coordination: Informal coordination and consultation with appropriate agencies and/or organizations within the Department of the Army which may contribute to this study are authorized. In addition, formal coordination of the initial draft study (with possible exception of Phase I - see paragraph 5) will be accomplished with the following agencies or organizations:

CDCCD-F 30 October 1963
SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

(1) US Army Combat Developments Command Combat Service Support Group

(2) US Army Electronics Research and Development Laboratory

(3) US Army Chemical Center and School

(4) US Army Combat Developments Command Nuclear Group

(5) US Army Combat Developments Command Command Control Information System Group.

b. Suspense dates: Target completion dates are as follows:

Phase I	(An updating of CMLCD 61-1, Phase I) Final Draft (updated):	29 February 1964
Phase II	Initial Draft:	13 March 1964
	Final Draft:	13 May 1964
Phase III	Initial Draft:	13 March 1965
	Final Draft:	15 May 1965

c. Distribution: A recommended distribution list for the final report will be submitted with the final draft study.

7. This project is assigned Project No. USACDCCBRA 64-8 and appears in paragraph 1220oo of the CDOG.

FOR THE COMMANDER:

/s/ Lewis V. Edner
/t/ LEWIS V. EDNER
Major, QMC
Asst Dir, Pers & Orders

DISTRIBUTION:
F

CAGO-S (30 Oct 63) 1st Ind
SUBJECT: Combat Development Study Directive: USACDCCBRA 64-8, "Organization for Radiological Survey, 1965-1970 (U)"

HQ, U. S. Army Combat Developments Command Combined Arms Group, Fort Leavenworth, Kansas 66027, 6 Nov 1963*

TO: Commanding Officer, U. S. Army Combat Developments Command Chemical-Biological-Radiological Agency, Fort McClellan, Alabama

1. In addition to the coordination shown in inclosed study directive for Phase II and III, it is requested that formal coordination be accomplished with the following U. S. Army Combat Developments Combined Arms Group Agencies:

USA Combat Developments Command Infantry Agency
USA Combat Developments Command Engineer Agency
USA Combat Developments Command Communications-Electronics Agency
USA Combat Developments Command Combined Arms Agency
USA Combat Developments Command Aviation Agency
USA Combat Developments Command Intelligence Agency

2. It is requested that the Chemical-Biological-Radiological Agency undertake the action required in the inclosed study directive, and that final draft reach this headquarters not later than the dates shown below:

Phase I	13 February 1964
Phase II	27 April 1964
Phase III	15 April 1965

FOR THE COMMANDER:

/s/ William W. Cozad
/t/ WILLIAM W. COZAD
Lt Colonel, GS
Adjutant

*As changed by 1st Ind, CAGO-S, HQ USACDCCAG, 15 Nov 63, to Ltr, CDCCD-F, HQ USACDC, 8 Nov 63, subject as above, and by Ltr CAGO-S, HQ USACDCCAG, 2 Dec 63, subject as above.

ANNEX B

ORGANIZATIONAL AND OPERATIONAL CONCEPTS

1. Introduction. It is the purpose of this annex to analyze the organizational and operational concepts for radiological survey in the communications zone (COMMZ) during the 1965-1970 time period as envisioned by TASTA-70. Pertinent TASTA concepts which may cause radiological monitoring and ground and aerial radiological survey procedures to change from those currently in use in the COMMZ will be enumerated. Necessary changes to these procedures will be discussed, based on an analysis of TASTA organizational and operational concepts.

2. Organizational and Operational Concepts, TASTA.[1/] The basic TASTA concepts listed below are considered to have major influence on radiological survey and monitoring operations in the COMMZ.

a. The COMMZ is not divided into advance and base sections. The COMMZ remains undivided unless its depth exceeds several hundred miles, at which time the COMMZ may be divided into a forward support command and a rear support command.

b. A theater army support command (TASCOM) is organized for operation of the COMMZ. The TASCOM consists of five, vertically oriented, functionalized subordinate commands ("mission" services) and a sixth command--area support command--which provides direct support services to the "mission" command and other units passing through or located in the COMMZ. The TASCOM organization is tailorable to any size theater; the commands enlarge as the theater expands, but the basic organization of the functional commands remains unchanged.

c. Rear area damage control, to include developing the radiological contamination picture in the COMMZ, is a mission assigned to the area support command. The responsibility for supervising and coordinating area damage control operations is further assigned down to area support group. An area damage control center capability is provided at area support command headquarters and at each area support group headquarters for the purpose, among others, of developing and maintaining this radiological intelligence.

d. Automatic data processing (ADP) equipment is integrated throughout the TASCOM. A computational capability, or access to such a capability, is provided to area support command echelons down to and including area support group.

3. Requirement for Radiological Monitoring and Survey in the COMMZ.

a. The objective of radiological survey and monitoring operations is to obtain, in the shortest possible time, an accurate picture of radiological contamination on the ground. Specifically in the COMMZ, there is a requirement to determine the degree and extent of contamination at installations and supply activities, over supply routes, at communications, transportation, and industrial complexes, and at selected population centers. As developed by an earlier study,[3] radiological contamination intelligence is required:

(1) At or near installations, communications, and transportation complexes, in order to estimate casualties and to determine whether or not operations can be continued in the contaminated installation or complex.

(2) Over supply routes in order to plan alternate routes, if necessary, so that casualties and personnel radiation exposures may be reduced.

(3) In areas under consideration for unit occupancy to determine their suitability for long- or short-term occupancy.

(4) In cities and industrial complexes, in order that civil affairs units can plan for the possible evacuation of civil population with its resultant congestion of roads and traffic means, and to aid civil affairs units in determining the availability of local supplies, labor, and facilities for military use.

b. As reflected above, this requirement is stated for the current COMMZ organization in several doctrinal publications. DA FM 100-10,[4] emphasizes that Phase I area damage control operations in the COMMZ must include the preparation for detection of radiological hazards as a part of general readiness measures, and that Phase II area damage control operations in the COMMZ must include the collection, interpretation, and dissemination of radiological contamination information concerning critical areas, routes, and installations. General requirements for radiological contamination intelligence stated in DA FM 3-12 [5] are applicable to the communications zone. DA FM 54-1, [6] requires that rear area damage control procedures be in consonance with the provisions of STANAG 2079, [7] which, in turn, states that rear area damage control measures in the COMMZ must provide for protection against radiological hazards. This requirement is also stated in CENTO STANAG 2079. [50]

c. The rationale supporting the requirement for radiological contamination intelligence, as stated in paragraph 3a above, is common to any COMMZ, no matter how organized. Thus, a firm requirement for radiological contamination intelligence exists for a COMMZ organized under TASTA concepts. This requirement was recently emphasized by a study [8] considering COMMZ operations in nuclear war during the 1968-1972 time frame. Radiological monitoring and radiological survey are two of the means available during the 1965-1970 time frame to obtain information for developing such intelligence. (It should be pointed out that fallout prediction techniques as described in DA TM 3-210 [44] and DA TC 3-15 [45] contribute to the overall radiological intelligence situation in that they provide intelligence almost immediately following a nuclear burst and indicate a general area outside of which a specific degree of hazard will probably not occur if fallout results. However, a detailed discussion of these techniques is not within the scope of this study. The primary importance of fallout prediction as far as this study is concerned is its use in depicting suspect areas for early monitoring (or survey, if required)).

4. Radiological Monitoring.

a. Radiological monitoring is the act of detecting the presence of radiation and the measurement thereof with radiation measuring instruments. This procedure requires no special organization and is included in the normal information-gathering and reconnaissance activities of every unit or installation. Monitoring alerts the command to the arrival of fallout, alerts units on the move when they begin to receive fallout or encounter a contaminated area, and keeps the commander informed of the degree of radiological hazard in his unit area. [3] Monitoring is of two types: area monitoring which normally consists of spot-checking for radiation at the installation or unit position, and the monitoring of personnel, food, water, and equipment for low levels of contamination. The type of primary concern to this study is area monitoring. If sufficient data are collected from area monitoring reports to adequately delineate the contaminated area, a radiological survey will not be required.

b. The concepts in FM 3-12, as modified by Phase I: The Division [9] and Phase II: Corps and Field Army [10] of this study, require automatic monitoring reports to be submitted by a unit or installation as shown below:

(1) A "contact report" is submitted when the measured ground dose rate builds up to 1 rad/hr.

(2) A "peak dose-rate report" is submitted when the meter needle reaches its maximum reading (or comes back on scale). It should be realized that the "peak" dose rate may fluctuate for awhile before starting a continuing descent.

c. Other reports may be required by local SOP or by special instructions provided at the time.

d. The NBC 4 format prescribed by STANAG 2103, [11] and implemented by FM 3-12, [5] will continue to be used for monitoring reports.

e. Several new radiac instruments now under development are scheduled to become operational during the 1965-1970 time frame and will be used for radiological monitoring. The instruments are discussed in detail in Annex C but are mentioned here in connection with their employment concepts.

(1) A modified version of the Canadian IM-108B/PD radiacmeter has successfully undergone test and evaluation [2/12] as an interim supplement for the IM-174/PD, now recognized as possessing deficiencies. [13/14] (Deficiencies in IM-174/PD's now in the field are being corrected by a planned maintenance program.) The results of the evaluation indicated that the modified IM-108B/PD is superior to the IM-174/PD and the modified IM-108B/PD was type-classified Standard A as the IM-174A/PD on 31 March 1966. (As a corollary action, the IM-174/PD was reclassified Standard B.) Physically similar to the IM-174/PD, the IM-174A/PD will be employed in a manner similar to that currently in use with the IM-174/PD. [5]

(2) The ultimate instrument desired for actively conducting area monitoring operations in mobile situations during the time frame of interest is one which will satisfy the approved military characteristics (MC's) for a Tactical Survey Meter and Vehicular Radiac System. [15] (A draft QMR [16] is now being staffed to replace the MC's.) The AN/VDR-1 radiac system is being developed to satisfy this requirement and should be fielded by September 1968. [17] This system should replace both the IM-174/PD (and IM-174A/PD) and the AN/PDR-27J (the standard-A low-range beta and gamma monitoring set). From a monitoring standpoint, the AN/VDR-1 will be employed in a manner similar to the IM-174/PD. [5]

(3) US Army Combat Developments Command has recognized that a requirement exists for a recording radiation monitor and automatic radiation alarm system to be employed at fixed and semifixed installations in the CONUS. [18] As envisioned in the proposed QMR, [19] this system is a high-range, gamma dose-rate measuring system to

provide a means for continuous monitoring at such installations. (See Annex C for details.) The system will be employed continuously, as directed by the installation commander, under conditions or threat of nuclear war. It will furnish a permanent record of radiation dose rates prevailing at the individual sensor locations. Audible and visual alarms coupled with the recording monitor will preclude the necessity for continuous monitoring by individuals as required by current doctrine. 5/ Type classification of the equipment is expected by 1969. 19/

5. Radiological Survey.

a. Radiological survey is the directed effort to determine the distribution and dose rates of radiation in an area. In contrast to monitoring, radiological survey operations may require the diversion of appreciable numbers of equipments and personnel from the primary mission of the unit. Because of this, radiological surveys are conducted only when the essential radiological information cannot be obtained from monitoring reports. This could be a frequent occurence, however, in the COMMZ where mobile and semifixed installations are dispersed to the maximum extent practical as a passive protection against nuclear attack. In particular, the extent of radiological contamination of complex and lengthy transportation nets as well as areas under consideration for unit occupancy (see paragraph 3a of this annex) is unlikely to be adequately defined by monitoring alone. The proper planning of installation recovery procedures 21/ may require more detailed information on radiological contamination in surrounding areas than routine radiological monitoring provides, thus necessitating an organized survey effort.

b. Radiological survey is divided into two major classes: ground survey and aerial survey.

6. Ground Survey.

a. Ground radiological surveys are conducted by either mounted or dismounted survey parties, although surveys performed from armored vehicles are generally preferred from the standpoint of radiation exposure to personnel.

b. Phases I 9/ and II 10/ of this study enumerated the advantages and disadvantages of ground survey relative to aerial survey. Those listed below are applicable to COMMZ operations:

(1) Advantages:

(a) Can be accomplished by day or night.

(b) Can be accomplished in almost all weather conditions.

(c) Produces relatively detailed, accurate data including delineation of "hot spots."

(2) Disadvantages:

(a) Generation of data is slow.

(b) Transmission of reports may overload available communications circuits.

(c) Operation of survey parties diverts personnel and equipment from the primary mission of the unit or installation.

(d) The remaining radiation service of members of the survey party is materially reduced (no shielding is available unless personnel are mounted).

(e) Survey parties may not always be available. The situation may preclude their use.

(f) Maximum coordination through command channels is required to initiate and complete an effective survey.

(g) Rate of survey is largely dependent on trafficability of the area.

(h) Areas that can be surveyed are limited; terrain barriers, mined areas, and areas under hostile influence (guerrilla activity) may impede the conduct of ground survey.

c. A comparison in Phases I and II of this study of these advantages and disadvantages resulted in the conclusion that aerial survey should be the primary means of radiological survey in the division, corps, and field army.[9/10] There is no apparent reason why this should not also be true for the communications zone. However, the capability for ground survey must be retained for use in those instances when relatively detailed information is required or when aircraft are unavailable for radiological survey.

d. As discussed in paragraph 4e(1) of this annex, the IM-174A/PD radiacmeter will supplement (on an interim basis) the IM-174/PD for ground radiological survey early in the time frame. Late in the time frame, the developmental AN/VDR-1 vehicular radiac system is scheduled to become operational, and it will replace the IM-174/PD (and the IM-174A/PD) on a permanent basis. These instruments are discussed in detail in Annex C.

e. Operational techniques for conducting ground survey are adequately documented in FM 3-12. [5] These techniques are considered valid for the COMMZ throughout the 1965-1970 time frame. A maintenance support plan [29] has been prepared for the AN/VDR-1 system.

f. A ground radiological survey is conducted by a group consisting of a control party and one or more survey parties. The control party consists of one or more men who plan and direct the survey and screen and transmit the data to the authority ordering the survey. [5] In the COMMZ the control party will normally be located at an area support group headquarters, but may be located at higher echelons (e.g., the area damage control center of area support command) or at lower echelons (e.g., depot headquarters of a "tenant" or "lodger" depot). (See also paragraph 10b.) The survey party consists of a monitor and necessary support and security personnel, and one or more are organized as required from personnel of the unit or installation. [5] Control and survey parties may also be supplied from rear area damage control detachments located in the COMMZ.

g. Area commanders are responsible for erecting and maintaining radiological contamination marking signs. When authorized by the area commander, signs are posted by ground survey parties on main access routes or probable access points leading into a contaminated area at points where the measured dose rate is 1 rad/hr. [22]

h. COMMZ units with a capability for conducting ground surveys and the accompanying command and control concepts are discussed later in this annex.

7. Aerial Survey.

a. It has been established in paragraph 6 of this annex that aerial survey offers significant advantages over ground survey and should be the primary means of radiological survey in the COMMZ. In the COMMZ, aerial survey is particularly well-suited for determining radiological contamination of transportation nets which comprise the ground lines of communication (LOC). The presence and degree of this radiation hazard must be determined at the earliest possible time so that transportation can be re-routed if required. The speed, responsiveness, and flexibility of aerial survey provide a significant advantage when the size and complexity of these LOC are considered. (The use of ground survey and monitoring to supplement aerial survey in this situation should not be overlooked, however. Vehicular military police patrols, which are adequately provided with survey meters, can supply monitoring and survey data along roads. [3] This capability is discussed more fully later in this annex.)

b. Several items now under development will improve the currently deficient aerial survey capability.

(1) The IM-174/PD radiometer is currently used for aerial survey although this instrument is decidedly unsatisfactory for such a purpose. The IM-174/PD is intended primarily for ground survey and monitoring operations in which its slow response time is not detrimental. When used for aerial survey, this instrument requires that the aircraft pilot maintain a reduced ground speed (ground speeds over 53 knots are not recommended [5]), a constant height above the terrain to enable data to be corrected to ground-level (1-meter-above-ground) dose rates by manual application of a constant air-ground correlation factor (AGCF), a constant heading during surveys conducted by the course-leg technique, and a constant ground speed to enable correlation of dose rate and aircraft position. [5] Further, a monitor is required in the aircraft specifically to read the instrument and record the readings. From the standpoint of aerial survey, the IM-174A/PD will provide only a marginal improvement--its increased accuracy and stability. No difference from current operational concepts would result from the employment of the IM-174A/PD for aerial survey.

(2) The Quadripartite countries are currently conducting tests [22] on the Canadian AN/ADR-501 Radiation Detection Set, Airborne, with the aim of standardizing it as an interim Quadripartite Aerial Radiac Set. In contrast to the IM-174/PD and IM-174A/PD, the AN/ADR-501 is designed specifically for aerial survey operations. However, significant changes from aerial survey operational procedures now in use [2] are not envisioned. Although possessing a faster response time (allowing greater aircraft speeds) and a recorder which provides a permanent record of the aerial dose rates encountered, the AN/ADR-501 still requires a monitor in the aircraft to operate the instrument and does not eliminate the necessity for the pilot to maintain constant ground clearance, ground speed, and heading. Type classification of the AN/ADR-501 is anticipated by July 1966. An important factor in determining procurement needs of the US Army for the AN/ADR-501 will be the availability date of the more sophisticated AN/ADR-6 aerial radiac system now being developed by the US Army.

(3) North American Aviation, Inc., is developing under contract the AN/ADR-6 to satisfy the approved MC's for an Aerial Radiac Instrument System. [24] (A proposed QMR [25] is now being staffed at Department of the Army to replace the MC's.) This system possesses an extremely rapid response time and automatically records in the aircraft dose rates height-corrected to those at aircraft positions by signals (corresponding to AGCF's) from an absolute altimeter. In

conjunction with aircraft position indicating or navigating devices, the system (with additional equipment[30]) may also record ground position information correlated to dose-rate data. A telemetry output is available and the system can transmit data to a ground receiving station if the aircraft is equipped with a data link. No monitor is required in the aircraft to operate the system; the equipment can be employed in drones. It can be seen that the AN/ADR-6 removes speed and altitude restrictions on the pilot and, if the aircraft is equipped with an automatic navigator, no course requirements are imposed on the pilot. The feasibility of such an aerial radiac system has been proven in tests.[26] Detailed operational, organizational, and logistical concepts for the AN/ADR-6 are documented in Phase II[10] of this study and are not repeated here. A maintenance support plan[43] has been prepared for this system. Type classification of this system is programmed for late 1966.[27] and the AN/ADR-6 should replace the IM-174/PD (or IM-174A/PD or AN/ADR-501) for aerial survey in the field prior to 1968. A recommended basis of issue for this system to COMMZ units is presented in Annex C.

c. COMMZ units with a capability or mission to perform aerial survey are discussed below.

8. <u>COMMZ Units with a Radiological Monitoring and Survey Capability</u>.

a. Radiological Monitoring.

(1) All TASTA units and installations have a radiological monitoring mission included with their normal reconnaissance or information-gathering activities. Personnel operating fixed and semifixed installations within the COMMZ will use the recording radiation monitor and automatic radiation alarm system on a routine basis when it becomes available (see also Annex C). All other units, to include those manning fixed and semifixed installations prior to the fielding of the recording radiation monitor, will perform monitoring operations with the IM-174/PD or IM-174A/PD according to current doctrine.[3]

(2) In particular, military police (MP) units will perform radiological monitoring as a routine part of their vehicular or foot patrols of ground LOC. MP COMMZ companies organic to both the MP brigade of the TASCOM area support command and the MP battalion of each area support group, and MP guard companies, similarly organic to the area support command but normally attached to the transportation command, have stated[1] missions to patrol transportation nets or support railroad operations and, accordingly, should be adequately equipped with ground dose-rate meters (see Appendix II to Annex C).

b. Ground Survey.

(1) All COMMZ units will be capable of providing equipment and personnel for ground radiological survey when required, but only at the expense of their primary mission. In certain instances, however, such units may be required to conduct such a survey. For example, an installation commander will normally be responsible for his own security and damage control measures if his installation still possesses an operational capability following a nuclear detonation. Should fallout result from the burst, the installation commander might be required to supplement his monitoring data by organizing and conducting a ground survey of his installation in order to adequately and intelligently plan his Phase II area damage control operations. The effective resumption of his primary mission might, in fact, be dependent on such action.

(2) Provisional and TOE rear area damage control detachments in the COMMZ require a ground radiological survey capability. This capability is required in order to plan and conduct effective damage control operations for transportation nets, critical areas, and industrial centers, and for unit or installation areas in which the severity of damage has temporarily rendered the unit command incapable of operation. Rear area damage control detachments currently organized under TOE 29-407D have such a capability in their reconnaissance section, which is equipped with three 1/4-ton trucks and three IM-174/PD radiacmeters. This capability should be maintained throughout the 1965-1970 time frame, and provisionally organized rear area damage control detachments must be provided a similar capability for ground radiological survey.

(3) Companies of the MP battalion, COMMZ, have a stated [1/] mission under TASTA concepts to assist in area damage control operations and accordingly may be required to perform vehicular ground surveys. (This mission is stated [28/] for the currently organized COMMZ as well.) One ground dose-rate meter should be authorized for each patrol vehicle in the operating platoons (see Appendix II to Annex C).

(4) The TASTA concept [1/] provides for certain tactical forces to be assigned to the area support command on an "as required" basis to enhance organic rear area security capabilities of TASCOM units. When such requirements exist, armored cavalry elements are likely to be frequently assigned this role. Scout sections of these elements have a radiological survey mission and capability and can be employed for ground surveys on a priority basis when required.

c. Aerial Survey.

(1) The rear area damage control detachments discussed in paragraph 8b(2) above, must also possess an organic capability to perform aerial radiological surveys using either manned or unmanned aircraft as the situation requires. These units may well be the primary source of aircraft to conduct such operations. (Currently organized rear area damage control detachments, TOE 29-407D, each include a utility helicopter team equipped with two utility helicopters and two radiacmeters for aerial survey.) As indicated in Annex C, the AN/ADR-6 should be authorized TASTA rear area damage control detachments to provide them with adequate aerial survey instrumentation.

(2) The headquarters and headquarters detachment (TOE 19-76) of the MP battalion, COMMZ, has an organic aerial surveillance section for the purpose (among others) of assisting in area damage control operations. 1/ Therefore, this section with its anticipated 49/ six observation helicopters is another major source of aircraft for aerial radiological survey operations. An allocation of AN/ADR-6 aerial radiac systems to this headquarters detachment is recommended in Annex C. Six of these units are envisioned 1/ in a TASCOM supporting a 12-division force (four in a TASCOM supporting an eight-division force).

(3) Other major sources of aircraft for conducting aerial survey are tactical forces assigned the area support command when the situation so warrants. As indicated in paragraph 8b(4) of this Annex, armored cavalry elements will frequently be among these tactical forces. Both the aviation company of armored cavalry brigades and the air cavalry troop of armored cavalry squadrons have a stated mission of aerial survey.

9. <u>CBR Data Evaluation Centers in the COMMZ</u>.

a. An ADCOC is envisioned by TASTA 1/ at area support command headquarters and area support group headquarters under the control of the assistant chief of staff for security, plans, and operations. The ADCOC may comprise a portion of an overall rear area security and area damage control branch.

b. The mission of the ADCOC in the COMMZ is essentially the same as that of area damage control centers prescribed by CO-STAR 31/ for the field army support command (FASCOM). (CO-STAR TOE's utilize the abbreviation "ADCC" for area damage control center rather than the approved "ADCOC." "ADCOC" is used throughout this study for uniformity.) The ADCOC will be suitably staffed with chemical and engineer personnel to operate the center on a 24-hour basis. It will maintain, plot, and forecast information on nuclear bursts, radiological fallout, contingent

effects, chamical and biological contamination, and other residual effects of mass destruction weapons as well as damage due to natural disaster. Included in its mission is the maintenance of a current situation map showing unit locations, routes, and conditions. It will be the receiving point for reports coming to the area support command headquarters or area support group headquarters on such matters.

c. Manning levels have not as yet been finalized for TASTA units. However, the similarity of missions between TASTA and CO-STAR ADCOC's warrants the illustration of the manning level of a typical CO-STAR ADCOC as an example of how TASTA ADCOC's should be staffed. In fact, the manning level indicated below is considered the minimum essential to perform the mission described in paragraph 9b above. The ADCOC manning level in Table B-1 is extracted from TOE 54-12T, Headquarters and Special Troops FASCOM.

TABLE B-1

MANNING LEVEL OF A TYPICAL ADCOC

Title	No.	MOS	Grade	Branch
ADCOC Dir	1	57314	Maj	Cml
Engr Staff O	1	57010	Maj	Engr
ADCOC Tm Ch	2	57314	Capt	Cml
ADCOC Op Sgt	1	54E50	E-8	Cml
Engr Op Sgt	2	12D50	E-8	Engr
Plotter	4	54E40	E-7	Cml
Computer	2	54E20	E-6	Cml
Op Sp	2	11F20	E-5	
Clk Typ	1	71B30	E-4	

and dissemination of radiological contamination information. These centers have a mission similar to CO-STAR ADCOC's and require a similar manning level (4 officers and 12 enlisted men). Figure B-1 illustrates the envisioned flow of raw and processed radiological contamination data in a COMMZ organized under the TASTA concept.

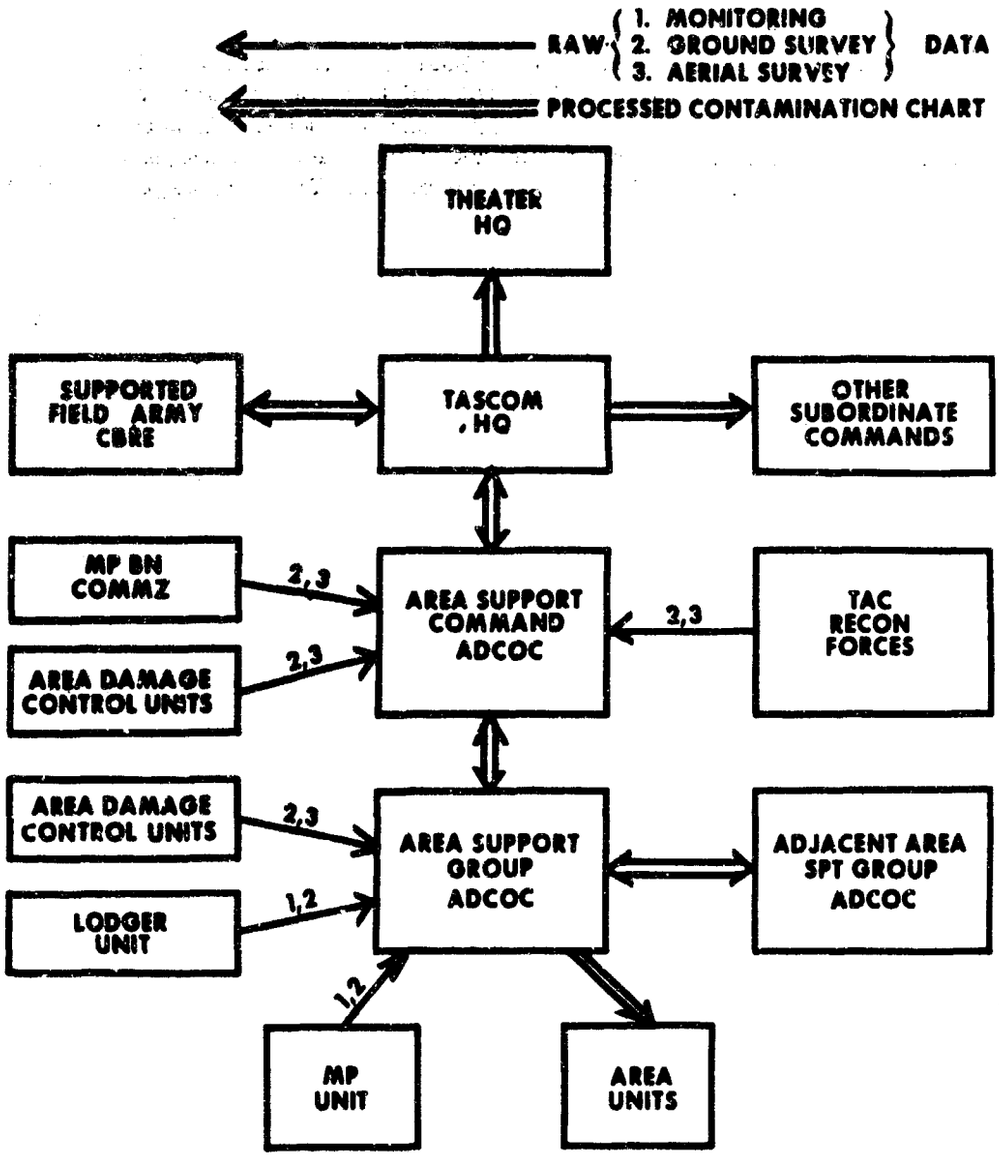

Figure B-1

ENVISIONED FLOW OF RADIOLOGICAL CONTAMINATION DATA IN THE COMMZ

ANNEX C

EQUIPMENT REQUIREMENTS

1. Introduction. The purpose of this annex is to review both current and developmental ground and aerial dose-rate meters which will be available during the 1965-1970 time frame, and to propose bases of issue for these instruments in the COMMZ. Time-phasing of dose-rate meters in the COMMZ during the time frame is illustrated.

2. Current Ground Dose-Rate Meters.

a. IM-174/PD: The IM-174/PD [32] tactical survey meter is currently used throughout the US Army. Operating on the ion chamber principle, it measures gamma radiation dose rates from 0 to 500 rad/hour. A three-second time constant results in a slow response time; a serious disadvantage in aerial survey. This instrument will be used during the early part of the time frame of interest for conducting ground and aerial radiological survey and for area monitoring (see Table C-2). Recent testing [13/16] has revealed several major deficiencies in the performance, stability, and durability of the IM-174/PD and an interim supplement has recently been type-classified as Standard A (see paragraph 2b below). Concurrently, the IM-174/PD was reclassified from Standard A to Standard B. Existing IM-174/PD's in the field are now involved in a planned maintenance program to correct deficiencies.

b. IM-174A/PD: A modified version of the Canadian IM-108B/PD has successfully undergone test and evaluation [2/12] as an interim supplement for the IM-174/PD. On 31 March 1966, this radiacmeter was type-classified Standard A as the IM-174A/PD. This ion chamber instrument is physically similar to the IM-174/PD and measures gamma radiation dose rates in the range of 0 to 500 rad/hour. The IM-174A/PD does not have an electrical calibration, a linearity adjustment, or a separate expanded low range scale as does the IM-174/PD. Modifications to the Canadian IM-108B/PD for US Army use include the machining of a beta calibration port in the ion chamber wall to allow calibration by the US Army TS-784 ( )/PD field calibrator and the replacement of the tritium dial by a radium-faced dial for safety purposes. The results of the evaluation indicated that the IM-174A/PD is superior to the IM-174/PD. As a result of its adoption by the Army to supplement the IM-174/PD, it will also be used during the first half of the 1965-1970 time period for area monitoring and for ground and aerial survey (see Table C-2).

c. AN/PDR-27J: The IM-141/PDR-27J radiacmeter of the AN/PDR-27J radiac set [33] is currently the US Army Standard-A low-range tactical monitoring instrument. This radiacmeter operates on the Geiger-Mueller (GM) principle and is designed to measure gamma radiation dose rates from 0 to 500 millirad/hour and to detect beta radiation utilizing the 0.5 and 5 millirad/hour scales. The set is equipped with a two-compartment probe containing two GM tubes of different ranges. The AN/PDR-27J will be used in the first half of the 1965-1970 period for monitoring personnel, food, water, and equipment (see Table C-2).

d. AN/PDR-60: The AN/PDR-60 radiac set [34] is the US Army Standard-A alpha instrument and is designed to measure alpha radiation counting rates from 0 to 2,000,000 counts/minute. The alpha scintillation probe may be replaced with a probe sensitive to low-energy gamma radiation such as that emitted by decay products of plutonium. Although alpha contamination is not tactically significant, it is of concern to units which maintain surveillance on nuclear warheads and to explosive ordnance disposal (EOD) teams which perform render-safe operations on unexploded enemy or friendly nuclear weapons. The AN/PDR-60 will be used throughout the 1965-1970 time frame for detecting alpha contamination (see Table C-2).

3. Developmental Ground Dose-Rate Meters.

a. AN/VDR-1. The AN/VDR-1 radiac system is being developed to satisfy the approved MC's for a Tactical Survey Meter and Vehicular Radiac System. [15] (A draft QMR [16] is currently being staffed to replace the MC's.) In so doing, the AN/VDR-1 is scheduled to replace both the IM-174/PD (for area monitoring and ground survey) and the AN/PDR-27J (for monitoring personnel, food, water, and equipment) during the latter half of the time period under consideration (see Table C-2). This radiac system will measure gamma radiation dose rates from 1 millirad/hour to 500 rad/hour (1000 rad/hour desirable) and will detect beta radiation in the presence of a gamma radiation field of 1 rad/hour or less. A detector embodied within the radiacmeter itself will be used for obtaining dose rates inside the vehicle and for dismounted survey. A second plug-in detector with a side window, allows monitoring of personnel and materiel for beta and/or gamma contamination. A presettable audible and visual warning device is provided. This equipment is expected to be fielded by September 1968. [17]

b. Recording Radiation Monitor and Automatic Radiation Alarm System.

(1) As envisioned in the proposed QMR,[19] this system is a high-range, gamma dose-rate measuring system to provide a means for continuous monitoring at fixed and semi-fixed installations in the COMMZ. The system will consist of a console-recorder capable of accomodating at least 10 remote sensors with a measuring range of 1 to 1000 rad/hour, presettable automatic alarms, and necessary cables and connectors. The console-recorder provides both a visual meter readout and a permanent recording of the gamma dose rate measured by any of the remoted probes.

(2) As indicated in paragraph 4e(3) of Annex B, the system will be employed continuously, as directed by the installation commander, under conditions or threat of nuclear war. It will furnish a permanent record of radiation and visual alarms coupled with the recording monitor will preclude the necessity for continuous monitoring by individuals as required by current doctrine.[5] This system will not replace any existing US Army standard equipment.

(3) The system will be issued as installation property on a one-time basis. Except for replacement components and repair parts, the equipment will not be pooled at higher echelons. Operations are not required on a continuing basis for the recording monitor. When required, the recording equipment will be read by one person. Estimated annual replacement factors (as defined in DA SB 710-1 [20]) for the system are given in Table C-1.

TABLE C-1

ESTIMATED ANNUAL REPLACEMENT FACTORS FOR THE RECORDING RADIATION MONITOR AND AUTOMATIC RADIATION ALARM SYSTEM [19]

	Sensors	Recording Equipment
Worldwide Peacetime	0.10	0.04
Wartime Inactive	0.22	0.06
Wartime Active	0.36	0.08

(4) Type classification of the equipment is expectad in 1969,[19] although the possibility exists that use of off-the-shelf commercial components may considerably shorten this development time.

4. Distribution of Ground Dose-Rate Meters, 1965-1970.

a. A recommended allocation of ground dose-rate meters to COMMZ TOE units is presented in Appendix II to this annex. The allocation is based on an analysis of the stated [1] operational and organizational concepts for these units and is generally consistent with the guidelines listed below. Where TASTA COMMZ units are identical or similar to CO-STAR units employed in the FASCOM, the recommended allocation of dose-rate meters is (with few exceptions) consistent with that recommended in Phase II [10] of this study.

(1) IM-174/PD -- one per platoon and unit headquarters. An increased allowance for independent missions may be authorized (e.g., one for reconnaissance vehicle, one per every two aircraft utilized for aerial survey, one per engineer water point). [10]

(2) AN/PDR-27J -- one per subunit requiring a capability to detect low levels of beta and/or gamma radiation (e.g., medical section, support maintenance section, bath unit, engineer water point). [10]

(3) AN/PDR-60 -- one per team requiring a knowledge of the presence of alpha contamination during render-safe operations on a nuclear warhead (e.g., EOD team) and one per team performing maintenance, surveillance, or assembly of nuclear warheads. One AN/UDM-6 alpha calibration set should be authorized each unit possessing an AN/PDR-60. [10]

(4) IM-174A/PD -- Same as for the IM-174/PD.

(5) AN/VDR-1 -- one per IM-174/PD (or IM-174A/PD) or per AN/PDR-27J, whichever total is greater within a TOE subunit (paragraph) on a replacement basis, when available. [9][10] For example, if the current authorization is two IM-174/PD's and three AN/PDR-27J's the subunit will receive three AN/VDR-1's.

b. The recording radiation monitor and automatic radiation alarm system will not be issued on a TOE basis, but rather will be authorized by TA as installation property. It is believed that TA 50-914 [35] is the most appropriate table of allowances for such authorization. In accordance with the proposed QMR [19] for the system, one recording radiation monitor and automatic radiation alarm system should be authorized per fixed or semifixed installation located in the COMMZ (or in CONUS). Appendix I to this annex presents the exact wording of the proposed change to TA 50-914. This change should be implemented upon type classification of the system.

5. Developmental Aerial Dose-Rate Meters.

a. AN/ADR-501. The AN/ADR-501 is an aerial radiac set of Canadian design being developed, tested, and evaluated with the aims of satisfying stated Quadripartite MC's for an interim aerial radiac set and of standardizing the instrument on a Quadripartite basis. 23/ The AN/ADR-501 consists of a probe connected to a meter-recorder by a cable and is designed to measure aerial dose rates of gamma radiation from 0.1 to 100 rad/hour. The manual application of suitable AGCF's to measurements obtained by this instrument will provide an estimate of the corresponding dose rates at one meter above the ground. The AN/ADR-501 responds faster than the IM-174/PD, but its use still must be restricted to speeds typical of light fixed- or rotary-wing aircraft in order to obtain reliable data. Type classification of the instrument as an interim Quadripartite standard is anticipated in July 1966. As stated in paragraph 7b(2) of Annex B, an important factor in determining AN/ADR-501 procurement needs of the US Army is the availability date of the US Army developmental aerial radiac system, AN/ADR-6, discussed below. If the AN/ADR-501 is procured by the US Army, it will replace the IM-174/PD (and IM-174A/PD) for aerial survey pending the availability of the AN/ADR-6 (see Table C-2).

b. AN/ADR-6. The AN/ADR-6 is discussed in Annex B and detailed operational, organizational, and logistical concepts are presented in Phase II 10/ of this study. In brief, the AN/ADR-6, 36/ a significant advance in the state-of-the-art, is a rapid-response system capable of measuring aerial gamma dose rates from 0.03 to 300 rad/hour, automatically height-correcting these data to the corresponding 1-meter-above-ground dose rates by means of input signals from an absolute altimeter, and recording these height-corrected dose rates. If the aircraft is equipped with an automatic position indicating device, ground positions correlated to ground dose rates may also be recorded. If the aircraft is equipped with a data link, ground dose-rate and possibly position infomation can be telemetered to a ground receiving station in addition to being recorded in the aircraft. Since no monitor is required in the aircraft solely to operate the instrument, the AN/ADR-6 can be employed in unmanned aircraft. Type classification of the AN/ADR-6 is programmed for October 1966. This system will replace the IM-174/PD (or IM-174A/PD, or if procured, the AN/ADR-501) for aerial survey and will be used throughout the remainder of the 1965-1970 time frame (see Table C-2).

6. Distribution of Aerial dose-Rate Meters, 1965-1970.

a. Any distribution of the AN/ADR-6 aerial radiac system recommended in this or other phases 9/10/ of this study is equally applicable to the AN/ADR-501 aerial radiac set, with the exception that AN/ADR-501's will not be authorized for use with drone aircraft.

b. Rear area damage control detachments currently organized under TOE 29-407D have an organic utility helicopter team which is authorized two utility helicopters and two AN/ADR-7 aircraft radiac sets (an obsolete developmental item which was never type-classified 37/). In order to update this capability for the 1965-1970 time frame, it is recommended that two AN/ADR-6 aerial radiac systems be allocated the utility helicopter team of TOE 29-407D (or equivalent TOE developed by TASTA for the COMMZ). These systems would replace the obsolete AN/ADR-7 items currently authorized. Since both aircraft of this detachment are used solely for area damage control operations, an allocation of one AN/ADR-6 per aircraft is justified. As emphasized in paragraph 8c(1) of Annex B, this detachment is considered a primary source of aircraft for aerial radiological survey operations in the COMMZ.

c. Three AN/ADR-6 aerial radiac systems should be authorized the aerial surveillance section of the headquarters and headquarters detachment (TOE 19-76) of the MP battalion, COMMZ. As pointed out in paragraph 8c(2) of Annex B, this section may employ its six observation helicopters 49/ in support of area damage control operations to include aerial radiological survey. However, since this unit's aircraft are not used solely for this purpose but may be employed in a variety of other roles as well, only an allocation of one AN/ADR-6 per every two aircraft is justified.

d. Tactical forces such as armored cavalry and aviation units, which may be assigned to the area support command on an "as required" basis and which have an aerial survey mission and capability, are identical to units operating under division, corps, and field army control, and accordingly will have already been authorized AN/ADR-6 systems as provided in Phases I 9/ and II 10/ of this study.

7. Time-Phasing of Dose-Rate Meters, COMMZ, 1965-1970. Table C-2 describes sequential equipment changes for the COMMZ from dose-rate meters presently standardized to those anticipated to be available by 1970.

8. Summary. With the exception of the AN/PDR-60 alpha instrument, all currently standard dose-rate meters will be phased out by 1970. Deficiencies in the IM-174/PD tactical survey meter necessitate that existing stocks be supplemented very early in the time frame by the IM-174A/PD. In 1968, the AN/VDR-1 is scheduled to replace both the IM-174/PD (or IM-174A/PD) for ground survey and the currently standard AN/PDR-27J for low-range beta/gamma monitoring. One AN/VDR-1 should be authorized a TOE subunit on a replacement basis for each IM-174/PD or AN/PDR-27J already authorized, whichever total is greater. A recommended

distribution of ground dose-rate meters to COMMZ TOE units is presented in Appendix II. By 1968, the AN/ADR-6 aerial radiac system will have replaced the IM-174/PD (and IM-174A/PD) for aerial survey, although the Quadripartite AN/ADR-501 aerial radiac set may have been procured on an interim basis shortly before the availability of the AN/ADR-6. Two AN/ADR-6 systems should be allocated to the utility helicopter team of each rear area damage control detachment (TOE 29-407D or the equivalent). Three AN/ADR-6's should be authorized the aerial surveillance section of each MP battalion (COMMZ) headquarters and headquarters detachment (TOE 19-76). Tactical forces assigned to the COMMZ with a mission and capability for aerial survey are identical to those employed in the combat zone. AN/ADR-6 distribution to tactical units has been previously analyzed in Phases I and II of this study. All recommended distributions of the AN/ADR-6 apply equally to the AN/ADR-501, with the exception that AN/ADR-501's will not be authorized for use with drone aircraft. The developmental recording radiation monitor and automatic radiation alarm system will be available for use at fixed and semifixed COMMZ installations late in the time frame. This system will not replace any other radiac equipment. Upon type classification of this system, TA 50-914 should be changed as indicated in Appendix I to authorize as installation property one system per fixed or semifixed installation in COMMZ (or CONUS). Overall time-phasing of dose-rate meters is charted in Table C-2.

TABLE C-2

TIME-PHASING OF DOSE-RATE METERS, COMMZ, 1966-1970 (U)

	Present (1966)	1968	1970
Aerial Survey	Performed with IM-174/PD or IM-174A/PD in manned aircraft.	Performed with AN/ADR-6 in manned and unmanned aircraft. (Interim use of the AN/ADR-501 in manned aircraft is possible.	No change.
Ground Survey	Performed with IM-174/PD or IM-174A/PD.	Performed with AN/VDR-1.	No change.
Radiological Monitoring	Area monitoring performed with IM-174/PD or IM-174A/PD. Low-range beta-gamma monitoring performed with AN/PDR-27J. Alpha contamination detected with AN/PDR-60. No capability for automatically measuring and recording dose rates at fixed and semifixed installations.	Area monitoring and low-range beta-gamma monitoring performed with AN/VDR-1. No other change.	Radiation monitor and automatic radiation alarm system available at fixed and semi-fixed installations. No other change.

APPENDIX I

to

ANNEX C

PROPOSED CHANGE TO TA 50-914 (U)

It is proposed that TA 50-914 35/ include the recording radiation monitor and automatic radiation alarm system with the following basis of issue in Section II, Equipment, Signal -- Control List Major Items. This change should be implemented upon type classification of the system.

1	2	3
Line Item No.	Item, Basis of Issue, and Remarks	Allowances
Unknown	Recording radiation monitor and automatic radiation alarm system Per fixed or semifixed installation in COMMZ or CONUS - - - - - - - -	1

APPENDIX II

TO

ANNEX C

PROPOSED ALLOCATION OF GROUND DOSE-RATE METERS

1. IM-174/PD and AN/PDR-27J.

a. Allocation. The allocation of IM-174/PD and AN/PDR-27J instruments proposed below is based on an analysis of the stated [1] operational and organizational concepts for COMMZ units and is generally consistent with the guidelines listed in paragraph 4a of Annex C. (Allocations of the IM-174/PD apply equally well to the IM-174A/PD.) Where TASTA COMMZ units are identical or similar to CO-STAR units employed in the FASCOM, the recommended allocation is (with few exceptions) consistent with that recommended in Phase II [10] of this study. An asterisk (*) indicates that some portion of the proposed allocation merits special comment in paragraph 1b.

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(1)	(1-256)* HHC Avn Bn		
	Co Hq	1	
	Med Sec		1
	Pathfinder Det	1	
	TOTAL	2	1
(2)	(1-257) Avn FW Co		
	Co Hq	1	
	Op Plat Hq	1	
	2 Acft Plat Hq	2	
	Svc Plat Hq	1	
	TOTAL	5	
(3)	(1-258) Avn Mdm Hcptr Co		
	Co Hq	1	
	Op Plat Hq	1	
	2 Hcptr Plat Hq	2	
	Svc Plat Hq	1	
	TOTAL	5	

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(4)	(1-259) Avn Hvy Hcptr Co		
	Co Hq	1	
	2 Hcptr Plat	2	
	Maint Plat	1	
	TOTAL	4	
(5)	(3-97) Gen Cml Lab		
	Hq Sec	1	
	Radl Lab		1
	TOTAL	1	1
(6)	(3-500) Decon Tm (Tm FB)		
	TM Fb	2	3
	TOTAL	2	3
(7)	(5-111) HHC Engr Bde		
	Co Hq	1	
	TOTAL	1	
(8)	(5-112) HHC, Engr Const Gp		
	Co Hq	1	
	Avn Sec	3	
	TOTAL	4	
(9)	(5-114) Engr Const Spt Co		
	Co Hq	1	
	Eqp Plat	1	
	Maint Plat	1	
	Asphalt Plat	1	
	Quarrying Plat	1	
	TOTAL	5	
(10)	(5-116)* HHC, Engr Const Bn		
	Co Hq	1	
	Util Sec	2	
	Med Sec		2
	Avn Sec		1
	TOTAL	2	3
		5	

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(11) (5-117) Engr Eqp & Maint Co		
Co Hq	1	
Eqp Plat Hq	1	
Maint Plat Hq	1	
TOTAL	3	
(12) (5-118) Engr Const Co		
Co Hq	1	
Earthmoving Plat Hq	1	
2 Gen Const Plat Hq	2	
TOTAL	4	
(13) (5-124) Engr Dump Trk Co		
Co Hq	1	
2 Dump Trk Plat	2	
TOTAL	3	
(14) (5-129) Engr Co, Port Const		
Co Hq	1	
2 Const Plat Hq	2	
Svc Plat Hq	1	
TOTAL	4	
(15) (5-177) Engr Pipeline Const Spt Co		
Co Hq	1	
3 Pipeline Eqp Plat	3	
TOTAL	4	
(16) (5-201) HHC, Engr Const Comd		
Comm Plat Hq	1	
Hq Co	1	
Avn Sec	2	
TOTAL	4	
(17) (5-344) Engr Base Map Depot Co		
Co Hq	1	
3 Stor & distr Plat Hq	3	
TOTAL	4	

		Recommended Allocation	
		IM-174/PD	AM/FDR-27J
(18)	(5-346) HHD, Engr Base Topo Bn		
	Det Hq	1	
	TOTAL	1	
(19)	5-347) Engr Base Reprod Co		
	Co Hq	1	
	2 Reprod Plat Hq	2	
	TOTAL	3	
(20)	(5-500) Engr Plat Hq (Tm AB)		
	Tm AB	1	
	TOTAL	1	
(21)	(5-500) Water Purif Tm (Tm GC)		
	Tm GC	1	1
	TOTAL	1	1
(22)	(5-500) Water Purif Tm (Tm GD)		
	Tm GD	1	1
	TOTAL	1	1
(23)	(5-500) Real Estate Tm (Tm HH)		
	Tm HH	1	
	TOTAL	1	
(24)	(8-57) Med Holding Co		
	Co Hq	1	
	3 Holding Plat	3	3
	TOTAL	4	3
(25)	(8-111) HHC Med Comd		
	Hq Comd	2	1
	TOTAL	2	1
(26)	(8-122) HHD Med Gp		
	Det Hq	1	1
	TOTAL	1	1

	Recommended Allocation	
	Im-174/PD	AN/PDR-27J
(27) (8-126) HHD Med Bn		
Det Hq	1	1
TOTAL	1	1
(28) (8-127) Med Amb Co		
Co Hq	1	1
3 Amb Plat	3	
TOTAL	4	1
(29) (8-128) Med Clr Co		
Co Hq	1	
3 Clr Plat	3	3
TOTAL	4	3
(30) (8-129) Med Coll Co		
Co Hq	1	1
4 Coll Plat	4	
TOTAL	5	1
(31) (8-187) Med Depot Co (COMMZ)		
Dep Hq	1	1
TOTAL	1	1
(32) (8-204) Prev Med Svc Unit, Fld		
Det Hq	1	
3 Fld Con Sec	3	
3 Environ San Sec	3	3
Vet Sec		1
TOTAL	7	4
(33) (8-510) Fld Hosp		
Hosp Hq	1	
3 Hosp Units	3	3
TOTAL	4	3
(34) (8-520) Amb Train, Rail		
Admin Sec	1	1
TOTAL	1	1

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(35)	(8-551) Gen Hosp 1000 Bed		
	Sup & Svc Br	3	
	Med Svc		
	TOTAL	3	4
			4
(36)	(8-563) Station Hosp 100 Bed		
	Sup & Svc Br	2	
	Med Svc		
	TOTAL	2	2
			2
(37)	(8-564) Station Hosp 200 Bed		
	Sup Sec	2	
	Prof Svc Sec		
	TOTAL	2	2
			2
(38)	(8-565) Station Hosp 300 Bed		
	Sup & Svc Br	2	
	Med Svc		
	TOTAL	2	2
			2
(39)	(8-566) Station Hosp 500 Bed		
	Sup & Svc Br	2	
	Med Svc		
	TOTAL	2	2
			2
(40)	(8-567) Station Hosp 750 Bed		
	Sup & Svc Br	3	
	Med Svc		
	TOTAL	3	3
			3
(41)	(8-590) Conv Ctr		
	Co Hq	2	1
	6 Recond Co	6	
	TOTAL	8	1
			1

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(42)	(8-650) Med Lab		
	Hq Sec	1	
	Base Lab		1
	3 Mbl Lab	3	3
	TOTAL	4	4
(43)	(9-22)* HHC Ord Ammo Gp		
	Co Hq	1	
	TOTAL	1	
(44)	(9-36) HHC Ord Ammo Bn		
	Co Hq	1	
	TOTAL	1	
(45)	(9-38) Ammo Co DS/GS		
	Co Hq	1	
	Svc Plat	1	
	2 Mag Plat	2	
	TOTAL	4	
(46)	(9-48)* Sp Ammo Co GS		
	Co Hq	1	
	Maint Plat Hq	1	
	2 Maint Sec		4
	Stor Plat Hq	1	
	Sup & Svc Plat Hq	1	
	TOTAL	4	4
(47)	(9-59) Guided Msl Maint Co GS		
	Co Hq	1	1
	Msl Spt Plat	1	
	HAWK Spt Plat	1	
	Sup & Svc Plat	1	
	SGT Spt Plat	1	
	NIKE-HERC Spt Plat	1	
	TOTAL	6	1

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(48)	(9-117) Ord Tire Rep Co		
	Co Hq	1	
	3 Tire Rep Plat Hq	3	
	TOTAL	4	
(49)	(9-500) EOD Tm (Tm KA)		
	TM KA	2	1
		2	1
(50)	(10-201) HHC Petrol Bde		
	Hq Co	1	
	TOTAL	1	
(51)	(10-202) HHD Petrol GP		
	Det Hq	1	
	Avn Sec	2	
	TOTAL	3	
(52)	(10-206) HHC Petrol Op Bn		
	Co Hq	1	
	Petrol Prod Lab Sec		1
	Flt Spt Sec	2	
	TOTAL	3	1
(53)	(10-207) Petrol Op Co		
	Co Hq	1	
	Term Op Plat Hq	1	
	4 Pipeline Sec	4	
	TOTAL	6	
(54)	(10-292) HHC GRREG Gp		
	Co Hq	1	
	TOTAL	1	
(55)	(10-296) HHC GRREG Bn		
	Pers Eff Depot Plat Hq	1	
	Rec/Ship Sec		1
	Co Hq	1	
	TOTAL	2	1

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(56)	(10-297)* GRREG Co		
	Co Hq	1	
	Com Plat Hq	1	1
	Coll & Evac Plat	1	3
	TOTAL	3	4
(57)	(10-407) Airdrop Spt Co		
	Co Hq	1	
	4 Op Plat hq	4	
	TOTAL	5	
(58)	(10-417) Air Eqp Rep & Sup Co		
	Co Hq	1	
	2 Prcht & Tax Rep Plat Hq	2	
	Air Sup & Svc Plat Hq	1	
	TOTAL	4	
(59)	(10-437) Ldry & Renov Co		
	Co Hq	1	
	Class & Stor Plat Hq	1	
	Class Sec		1
	Stor Sec		1
	Ldry & Renov Plat Hq	1	
	Renov Sec		1
	2 Ldry Sec		2
	TOTAL	3	5
(60)	(10-449) Lab Svc Co		
	Co Hq	1	
	4 Plat Hq	4	
	TOTAL	5	
(61)	(12-18) Sp Svcs Det		
	Det Hq	1	
	TOTAL	1	

		Recommended Allocation	
		TM-174/PD	AM/PDR-27J
(62)	(12-66) HHD Pers & Admin Bn		
	Det Hq		
	TOTAL	1	
		1	
(63)	(12-67) Pers Svcs Co		
	Co Hq		
	TOTAL	1	
		1	
(64)	(12-107) Band		
	Bandmaster		
	TOTAL	2	
		2	
(65)	(12-111) HHC Pers Comd		
	Co Hq		
	TOTAL	2	
		2	
(66)	(12-112) Pers & Admin Gp		
	Gp Hq & Hq Co		
	TOTAL	1	
		1	
(67)	(12-560) Repl Reg Co		
	Co Hq		
	TOTAL	1	
		1	
(68)	(12-570) Admin Svcs Det		
	Hq Det		
	TOTAL	1	
		1	
(69)	(14-15) Finance GS Bn		
	Bn Hq Sec		
	TOTAL	1	
		1	
(70)	(14-17) Finance DS Det		
	Det Hq		
	TOTAL	1	
		1	

		Recommended Allocation	
		IM-174/PD	AN/PDR-27J
(71)	(19-47) MP Esct Gd Co		
	Co Hq	1	
	3 Plat Hq	3	
	12 Sqd	12	
	TOTAL	16	
(72)	(19-76)* HHD MP Bn, Army or COMMZ		
	Det Hq	1	
	Aerial Survl Sec	3	
	TOTAL	4	
(73)	(19-77)* MP Co, Army or COMMZ		
	Co Hq	1	
	3 MP Plat Hq	9	
	12 Sqd	24	
	TOTAL	34	
(74)	(19-97)* MP Phys Scty Co		
	Co Hq	1	
	3 Phys Scty Plat Hq	3	
	9 Scty Sqd	9	
	TOTAL	13	
(75)	(19-237) MP PW Proc Co		
	Co Hq	1	
	Plat Hq	1	
	TOTAL	2	
(76)	(19-247) MP Gd Co		
	Co Hq	1	
	3 Gd Plat Hq	3	
	9 Gd Sqd	9	
	MG Sec	4	
	TOTAL	17	

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(77) (19-256) HHC MP PW Camp		
Co Hq	1	
Med Sec		1
TOTAL	1	1
(78) (19-262) HHD MP Bde		
Det Hq	1	
TOTAL	1	
(79) (19-282) HHD MP PW Bde		
Det Hq	1	
TOTAL	1	
(80) (19-316) HHC MP Bn, Stkhd & Rehab Tng Ctr		
Co Hq	1	
Med Sec		1
TOTAL	1	1
(81) (19-500) HHD MP Bn (Tm AD)		
Det Hq	1	
TOTAL	1	
(82) (19-500) MP Plat Hq (Tm IG)		
Plat Hq	1	
TOTAL	1	
(83) (19-503) HHD Br, PW/Civ Intern Infor Ctr		
Det Hq	1	
TOTAL	1	
(84) (27-500) Hq Det (Tm AB)		
Tm AB	1	
TOTAL	1	

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(85) (29-118) Gen Sup Co		
Co Hq	1	
Eqp Plat Hq	1	1
2 Gen Sup Plat Hq	2	2
TOTAL	4	3
(86) (29-119) Rep Parts Sup Co		
Co Hq	1	
Sup Op Plat	1	1
Gen Eqp Parts Plat Hq	1	1
Hvy Eqp Parts Plat Hq	1	1
Elec Parts Plat	1	1
TOTAL	5	4
(87) (29-127) Hvy Mat Sup Co		
Co Hq	1	
Proc Plat Hq	1	1
Stor & Cl IV Eqp Plat	1	1
Ftn & Const Eqp Sup Plat	1	1
TOTAL	4	3
(88) (29-129) Acft & Msl Rep Parts Sup Co		
Co Hq	1	
Acft Rep Parts Sup Plat Hq	1	
Msl Rep Parts Sup Plat Hq	1	
TOTAL	3	
(89) (29-134) Lt Eqp GS Maint Co		
Co Hq	1	
Sup & Svc Plat	1	
Sig Eqp Rep Plat	1	1
Engr Eqp Rep Plat	1	
Cml & QM Eqp Rep Plat	1	
TOTAL	5	1

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(90) (29-136) HHD GS Maint Bn		
Det Hq	1	
Decon Sec	5	1
TOTAL	6	1
(91) (29-137) Hvy Eqp GS Maint Co		
Co Hq	1	1
Sup Svc & Evac Plat Hq	1	
Armt Maint Plat Hq	1	
Sp Eqp Maint Plat Hq	1	
2 Auto Maint Plat Hq	2	
TOTAL	6	1
(92) (29-139) Coll, Class & Salv Co		
Co Hq	1	
Shop Ofc		1
Disassy Plat	1	
Mat Proc Plat	1	
Hvy Lift & Evac Plat	1	
Salv Plat	1	
TOTAL	5	1
(93) (29-146) HHD Sup & Svc Bn		
Det Hq	1	
TOTAL	1	
(94) (29-147)*Sup & Svc Co		
Co Hq	1	
Sup Plat Hq	1	
Rec & Ship Sec		1
Bkry Sec		1
Petrol Plat Hq	1	
Ldry,Renov & Bath Plat Hq	1	
Renov Sec		1
Bath Sec	5	5
Ldry Sec		1
GRREG Sec		3
TOTAL	9	12

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(95) (29-227)* Army Calib Co		
Co Hq	1	1
2 Calib Plat Hq	2	
10 Secd Trf Sec	10	
TOTAL	13	1
(96) (29-403) Maint Mgt Det		
Det Hq	1	
TOTAL	1	
(97) (29-427) Maint Spt Co, COMMZ		
Co Hq	1	
Svc-Evac Sup Plat	1	
Elec Maint Plat	1	1
Hvy Maint Plat	1	
Maint Plat (DS)	1	
TOTAL	5	1
(98) (29-502) Inv Con Agcy		
Admin Svc Div	2	
TOTAL	2	
(99) (29-504) Prop Disposal Co		
Co Hq	1	
Op Plat Hq	1	1
Eqp Spt Plat	1	
Maint Plat	1	
TOTAL	4	1
(100) (29-512) HHC Fld Depot		
Depot Hq	2	
TOTAL	2	
(101) (41-500) HHC Civ Aff Bde, ASCOM		
Hq Comd	1	
TOTAL	1	

	Recommended Allocation	
	LM-174/PD	AN/PDR-27J
(102) (41-500) HHD Civ Aff Gp, ASCOM		
Hq Det	1	
TOTAL	1	
(103) (41-500) HH D Civ Aff Bn, ASCOM		
Hq Det	1	
TOTAL	1	
(104) (41-500) Civ Aff Co, ASCOM		
Co Hq	1	
4 Civ Aff Plat	4	
TOTAL	5	
(105) (54-302) HHC & Sp Trps TASCOM		
Hq Comd	3	
TOTAL	3	
(106) (54-312) Hq & Sp Trps, Sup & Maint Comd		
Hq Co	2	
Flt Spt Sec	3	
TOTAL	5	
(107) (54-322) HHC Fld Depot Comd		
Hq Co	2	
Flt Spt Sec	2	
TOTAL	4	
(108) (54-402) Hq & Sp Trps, ASCOM		
Hq Comd	2	
TOTAL	2	
(109) (54-422) HHC Area Spt Gp		
Co Hq	1	
TOTAL	1	

	Recommended Allocation	
	LM-174/PD	AN/PDR-27J
(110) (55-2) HHC Trans Comd		
ACofS Scty, Plans & Op	2	
TOTAL	2	
(111) (55-4) HHC Trans Mvt Con Gp		
Hq Co	1	
TOTAL	1	
(112) (55-12) HHD Trans Mtr Trans Gp		
Det Hq	1	
TOTAL	1	
(113) (55-16) HHD Trans Mtr Trans Bn		
Det Hq	1	
TOTAL	1	
(114) (55-17) Trans Lt Trk Co		
Co Hq	1	
3 Trk Plat Hq	3	
TOTAL	4	
(115) (55-18) Trans Mdm Trk Co		
Co Hq	1	
3 Trk Plat Hq	3	
TOTAL	4	
(116) (55-19) Trans Car Co		
Co Hq	1	
Sedan Plat Hq	1	
1/4-Ton Trk Plat Hq	1	
3/4-Ton Trk Plat Hq	1	
TOTAL	4	

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(117) (55-28) Trans Hvy Trk Co		
Co Hq	1	
3 Trk Plat Hq	3	
Drive-Away Plat	1	
TOTAL	5	
(118) (55-67) Trans Lt-Mdm Trk Co		
Co Hq	1	
2 Lt Trk Plat Hq	2	
Lt-Mdm Trk Plat Hq	1	
TOTAL	4	
(119) (55-111) HHC Trans Term Bde		
Hq Comd	1	
TOTAL	1	
(120) (55-112) HHC Trans Term Gp		
Co Hq	1	
TOTAL	1	
(121) (55-116) HHC Trans Term Bn		
Co Hq	1	
TOTAL	1	
(122) (55-117) Trans Term Svc Co		
Co Hq	1	
2 Ship Plat Hq	2	
2 Shore Plat Hq	2	
TOTAL	5	
(123) (55-118) Trans Term Transfr Co		
Co Hq	1	
3 Term Trnsft Plat Hq	3	
Eqp Plat	1	
Term Transfr Plat Hq (Aug)	1	
TOTAL	6	

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(124) (55-119) Trans Lighterage Co		
Co Hq	1	
2 Lighterage Plat	2	
Maint Plat	1	
TOTAL	4	
(125) (55-157) Floating Craft Depot Maint & Sup Co		
Co Hq	1	
Sup Plat	1	
TOTAL	2	
(126) (55-158) Trans Amphib/Landing Craft Maint Co		
Co Hq	1	
2 Maint Plat	2	
Sup Plat	1	
TOTAL	4	
(127) (55-201) HHC Trans Ry Bde		
ACofS Scty, Plans & Op	1	
TOTAL	1	
(128) (55-202) HHC Trans Ry Gp		
Co Hq	1	
TOTAL	1	
(129) (55-226) HHC Trans Ry Bn		
Co Hq	1	
TOTAL	1	
(130) (55-227) Trans Ry Engrg Co		
Co Hq	1	
6 Track Maint Sec	6	
2 Brg & Struct Maint Sec	2	
Comm & Ry Sig Maint Plat Hq	1	
TOTAL	10	

	Recommended Allocation	
	IM-174/PD	AN/PDR-27J
(131) (55-228) Trans Ry Equip Maint Co		
Co Hq	1	
Car Rep Plat	1	
Diesel-Elec Loco Rep Plat	1	
TOTAL	3	
(132) (55-229)* Trans Tn Op Co		
Co Hq	1	
2 Tn Op Plat Hq	2	
30 Road Crews	30	
TOTAL	33	
(133) (55-247) Trans Diesel-Elec Loco Rep Co		
Co Hq	1	
Diesel Eng Plat	1	
Diesel-Elec Plat	1	
TOTAL	3	
(134) (55-248) Ry Sup & Car Rep Co		
Co Hq	1	
Strip & Erect Plat Hq	1	
Shop Plat Hq	1	
Rail Sup Plat Hq	1	
TOTAL	4	
(135) (55-457) Trans Acft DS Co		
Co Hq	1	
Sup Plat Hq	1	
Shop Plat Hq	1	
3 DS Plat	3	
DS Plat (Aug)	1	
TOTAL	7	
(136) (55-459) Trans Acft Base Maint Co		
Co Hq	1	
Acft Rep Plat	1	
Airframe & Eng Rep Plat	1	
2 Comp Rep Plat	2	
TOTAL	5	

b. Special Remarks.

(1) (1-256) HHC Avn Bn. The current CO-STAR TOE provides for one pathfinder detachment to augment this unit. If also provided in the TASTA TOE, this pathfinder detachment should be allocated one IM-174/PD. Pathfinder detachments require this instrument in order to possess the limited radiological reconnaissance capability necessary to perform their primary mission. 46/

(2) (5-116) HHC Engr Const Bn. The proposed allocation of two IM-174/PD's and the two AN/PDR-27J's to the utility section is based on the assumption that this section will operate two water points, as does the currently organized section.

(3) (9-22) HHC Ord Ammo Gp. If the TOE organized under TASTA has an EOD control section which may perform actual disposal operations, it should be equipped with two IM-174/PD's and one AN/PDR-27J as is its CO-STAR counterpart.

(4) (9-48) Sp Ammo Co GS. The proposed allocation of four AN/PDR-27J radiac sets to the two maintenance sections is based on the assumption that each section will have two nuclear weapon maintenance teams.

(5) (10-297) GRREG Co. The proposed allocation of three AN/PDR-27J's to the collection and evacuation platoon is based on the assumption that the platoon will contain three search and recovery teams.

(6) (19-76) HHD MP Bn, COMMZ. The three IM-174/PD's proposed for the aerial surveillance section should be replaced by three AN/ADR-6 aerial radiac systems upon type-classification of the system.

(7) (19-77) MP Co, COMMZ. The proposed allocation of nine IM-174/PD's to the three platoon headquarters and 24 IM-174/PD's to the 12 squads is based on the assumptions that each platoon headquarters will contain three patrol vehicles and that each squad will have two patrol vehicles.

(8) (19-97) MP Phys Scty Co. The proposed allocation of one IM-174/PD per squad is a change from that proposed in Phase II 10/ of this study and is based upon the independence of action and location anticipated for each squad.

(9) (29-147) Sup & Svc Co. The proposed allocation of five IM-174/PD's and five AN/PDR-27J's to the bath sectio.. is based on the assumption that this section will operate five distinct bath units. The proposed allocation of three AN/PDR-27J radiac sets to the graves registration section is based on the assumption that this section will provide three search and recovery teams.

(10) (29-227) Army Calib Co. The proposed allocation of one IM-174/PD per secondary transfer section is based on the independence of action and location envisioned [47] for each section.

(11) (55-229) Trans Tn Op Co. Each road crew requires one IM-174/PD because of its independence of action and location, whereas yard crews do not require the instrument. The TASTA study [1] envisions 30 road crews in this unit.

2. AN/PDR-60.

a. The allocation of AN/PDR-60 radiac sets to COMMZ units is proposed separately in this paragraph, in view of the alpha instrument's extremely limited distribution.

		Recommended Allocation AN/PDR-60
(1)	(3-97) Gen Cml Lab	
	Radl Lab	1
(2)	(9-22) HHC Ord Ammo Gp	
	EOD Con Sec (if authorized)	2
(3)	(9-48) Sp Ammo Co GS	
	2 Maint Sec	4
(4)	(9-500) EOD Tm (Tm KA)	
	Tm KA	2

b. One AN/UDM-6 alpha calibrator set[48] should be authorized each unit provided with one or more AN/PDR-60's.

3. IM-174A/PD. To supplement existing stocks of the IM-174/PD, the IM-174A/PD will be allocated in exactly the same manner as the IM-174/PD would have been allocated.

4. AN/VDR-1. When available, one AN/VDR-1 radiac set will generally be supplied on a replacement basis for each IM-174/PD or for each AN/PDR-27J authorized a TOE paragraph, whichever total is greater. As examples, consider the following COMMZ TOE's and their allocation (as proposed in paragraph 1a above) of IM-174/PD and AN/PDR-27J instruments:

	Recommended IM-174/PD	Recommended AN/PDR-27J	Proposed AN/VDR-1
a. (10-297) GRREG Co			
Co Hq	1		1
Cem Plat Hq	1	1	1
Coll & Evac Plat	1	3	3
Total - Current Instruments	7		
Total - Future Instruments			5
b. (29-147) Sup & Svc Co			
Co Hq	1		1
Sup Plat Hq	1		1
Rec & Ship Sec		1	1
Bkry Sec		1	1
Petrol Plat Hq	1		1
Ldry,Renov,&Bath Plat Hq	1		1
Renov Sec		1	1
Bath Sec	5	5	5
Ldry Sec		1	1
GRREG Sec		3	3
Total - Current Instruments	21		
Total - Future Instruments			16

ANNEX D

COMMUNICATIONS REQUIREMENTS

1. Introduction. The purpose of this annex is to determine what communications are required to support radiological monitoring and survey operations in the COMMZ. Although ADP equipments are assumed to be available, the requirement for an inherent manual back-up is recognized.

2. Central Agencies. The central agencies for all radiological survey and monitoring operations in the COMMZ are the area damage control centers (ADCOC's), since it is there that raw radiological data are processed into meaningful radiological intelligence--the radiological contamination chart or overlay. Accordingly, communications requirements are discussed from the standpoint of input to, computation by, and output from the ADCOC.

3. Input Communications Requirements.

a. Monitoring. Figure B-1 in Annex B indicates the envisioned flow of radiological contamination data. From this figure, it can be seen that monitoring input to the area support group ADCOC can be expected from any unit within the support group area and, in particular, from vehicular MP patrols. These units require communications equipment capable of communicating directly with the area support group ADCOC. Message format will be the NBC 4 report prescribed by current doctrine. 5/ Message precedence will be dependent on the situation.

b. Ground Survey. Ground survey reports may be input to the appropriate ADCOC from several sources as shown in Figure B-1. The area support group ADCOC will receive such reports from any unit within the support group area and, in particular, from vehicular MP patrols and area damage control units. Communication equipments used by area units and MP patrols for submitting monitoring reports will also be used for submitting ground survey reports. Area damage control units require an organic capability to communicate survey reports to the support group ADCOC. The area support command ADCOC will receive ground survey reports from ADCU, MP battalion (COMMZ), and tactical reconnaissance forces provisionally assigned to the area support command for security purposes. The MP battalion and battalion-size reconnaissance elements will submit ground survey reports by means of their organic input/output (I/O) device directly into the computer envisioned at area support command with printout to the ADCOC. Support command ADCU's

require remote message entry devices (MED) to enter ground survey reports directly into the computer (with printout to the ADCOC). Message format for ground survey reports is prescribed [5] as DA Form 1971-1-R or DA Form 1971-1-R. Alternately, the reports may be submitted in the NBC 4 format. Precedence of reports will be determined by the authority ordering the survey.

c. Aerial Survey. Aerial survey reports will be received by an ADCOC from area damage control units from the MP battalion (COMMZ), or from aviation units provisionally assigned to the area support command. Prior to the availability of the AN/ADR-6 aerial radiac system, these units will submit aerial survey reports to the appropriate ADCOC by methods identical to those used for ground survey reports, using DA Form 1971-1-R as prescribed in FM 3-12. [5] When the AN/ADR-6 becomes operational, data recorded on the chart associated with this radiac system are delivered directly to the ADCOC by physical drop or by messenger. If in-flight telemetry is employed, data are received at a ground sensor terminal section located either at the airstrip or adjacent to the ADCOC and are subsequently transmitted directly to the ADCOC by I/O device. Since the telemetry output of the AN/ADR-6 is envisioned to be analog rather than digital in nature, there will be a requirement for an analog-digital converter at the ground sensor terminal section to digitize the data, insuring compatibility with the ADP language. Precedence of aerial survey reports will be determined by the authority ordering the survey.

4. Computation Communications Requirements. After receipt of radiological survey and monitoring reports, the ADCOC plots the data and draws in dose-rate contours (in accordance with procedures given in FM 3-12) to produce contamination charts--the end product. Currently, these procedures are carried out by tedious, manual methods requiring hours of effort. Recent studies and war games [8/38] have indicated that COMMZ operations are particularly sensitive to a nuclear environment in which long-term, sustained, high-efficiency operations may become secondary to survival and recovery of command control. The utilization of automatic data processing in the COMMZ will significantly lessen the time spent in preparing radiological contamination charts and allow ADCOC personnel to direct more effort in interpreting the charts in terms of what area damage control procedures are necessary, when they should be initiated, and in what manner. This rationale lends support to a requirement that an automated radiological contamination charting function be provided to ADCOC's in the COMMZ. A systems analysis of the application of ADP to radiological contamination charting in the field army has been approved by US Army Combat Developments Command [39] and a draft Functional Area Description (FAD) for

this function has been prepared [40] in accordance with the ADSAF Implementation Plan. [41] The procedures described in the systems analysis and the FAD are equally applicable to, and would require an identical computational capability for, the COMMZ. The area support command ADCOC has direct access to a computer located at its headquarters. Area support group ADCOC's require direct communications links with the area support command computer to provide them with this capability.

5. Output Communications Requirements. After its preparation at the ADCOC, the radiological contamination chart must be disseminated to higher, adjacent, and lower echelons with a need-to-know. Figure B-1 indicates the envisioned output of contamination charts in the COMMZ. Phases I and II [9][10] of this study concluded that transforming this chart into a series of readings and coordinates for transmission using the NBC 5 format [5] is highly unsatisfactory. After receipt by addressees, data from the NBC 5 report must be re-plotted and dose-rate contours drawn in, a time-consuming process. Further, the shape of dose-rate contours drawn to correspond with a relatively brief series of readings and coordinates can vary significantly from one recipient to the next, a harmful influence on command planning. STANAG 2103, [11] which prescribes the NBC 5 format to be used if contamination charts must be transmitted as a series of readings and coordinates, states that these charts are "best sent by means of a trace or overlay if time and distance permit." The impact of radiological contamination on COMMZ operations and the urgency necessary to recover command and control, and undertake appropriate damage control measures normally precluded the use of a courier. Based on the above discussion, it is considered that all criteria required to justify hard copy channels of electrical communication for dissemination of radiological contamination charts have been met.

6. Summary. The following communications are required to support radiological survey and monitoring operations in the COMMZ:

a. A capability for area units, ADCU, and vehicular MP patrols to communicate monitoring and survey reports to the area support group ADCOC.

b. A capability for support command ADCU, MP battalion (COMMZ), and tactical reconnaissance forces to enter survey reports directly into the computer located at area support command with information printout in the area support command ADCOC.

c. Direct access by ADCOC's at all echelons to a computer with the capability for performing the radiological contamination charting function of ADSAF.

d. A capability to digitize the analog output of the AN/ADR-6 aerial radiac system, rendering it compatible with the ADSAF language.

e. A capability to electrically disseminate hard copy radiological contamination charts from ADCOC's at all echelons to higher, adjacent, and subordinate units as indicated in Figure B-1.

ANNEX E

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ANNEX F

DISTRIBUTION

Distribution J, plus the following agencies:

1--Director, U. S. Army CBR Weapons Orientation Course, Dugway Proving Ground, Dugway, Utah 84022 (1 cy)

2--Commandant, U. S. Army Signal School, ATTN: Document Division, Fort Monmouth, New Jersey 07703 (1 cy)

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15--Commandant, U. S. Army Armor School, Fort Knox, Kentucky 40121 (1 cy)

16--Commandant, U. S. Army Artillery and Missile School, Fort Sill, Oklahoma 73504 (1 cy)

17--Commandant, U. S. Army Aviation School, Fort Rucker, Alabama 36362 (1 cy)

18--Commander, Documentations Center, Cameron Station, Alexandria, Virginia 22314 (20 cys) (forwarded through CG, USACDC, Fort Belvoir, Virginia 22060)

19--Commanding General, First United States Army, Fort George G. Meade, Maryland 20755 (1 cy)

20--Commanding General, Third United States Army, Fort McPherson, Georgia 30330 (1 cy)

21-- Commanding General, Fourth United States Army, Fort Sam Houston, Texas 78234 (1 cy)

22--Commanding General, Fifth United States Army, 1660 E. Hyde Park Boulevard, Chicago, Illinois 60615 (1 cy)

23--Commanding General, Sixth United States Army, Presidio of San Francisco, California 94129 (1 cy)

24--Commanding General, Seventh United States Army, APO New York 09046 (1 cy)

25--Commanding General, Eighth United States Army, APO San Francisco, 96301 (1 cy)

26--Director, U. S. Army Operations Research Group, Edgewood Arsenal, Maryland 21010 (1 cy)

27--Chief, U. S. Army Historical Office, Edgewood Arsenal, Maryland 21010 (1 cy)

28--Commanding Officer, U. S. Army Edgewood Arsenal, Edgewood Arsenal, Maryland 21010 (1 cy)

29--Commanding Officer, U. S. Army Chemical Research and Development Laboratories, ATTN: Technical Library, Edgewood Arsenal, Maryland 21010 (1 cy)

30--Commanding Officer, Dugway Proving Ground, Dugway, Utah 84022 (1 cy)

31--Quadripartite Standardization Committee, Building 5101, Edgewood Arsenal, Maryland 21010 (1 cy)

32--Commanding General, U. S. Army, Japan, APO San Francisco 96343 (1 cy)

33--Commanding General, U. S. Army, Hawaii, APO San Francisco 96557 (1 cy)

34--Commanding General, U. S. Army Medical Research and Development Command, ATTN: CBR Liaison Officer, Main Navy Building, Washington 25, D. C. (1cy)

35--Chief, Bureau of Yards and Docks, Department of the Navy, Washington 25, D. C. (1 cy)

36--The Provost Marshal General, ATTN: Plans and Training Division, Department of the Army, Washington 25, D. C. (1 cy)

37--Commanding Officer, U. S. Army Nuclear Defense Laboratory, Edgewood Arsenal, Maryland 21010 (1 cy)

38--U. S. Army CDC CBRA Liaison Officer, Bldg 5101, Edgewood Arsenal, Maryland 21010 (1 cy)

39--Commanding Officer and Director, U. S. Naval Radiological Defense Laboratory, San Francisco 24, California (1 cy)

40--Commanding General, Defense Atomic Support Agency, Washington 25, D. C. (1 cy)

41--Commanding Officer, Armed Forces Radiobiology Research Institute, National Naval Medical Center, Bethesda, Maryland (1 cy)

42--Commanding General, U. S. Army Electronics Command, ATTN: Radar-Combat Surveillance Management Office, Fort Monmouth, New Jersey, 07703 (1 cy)

43--The Surgeon General, Department of the Army, Washington 25, D. C. (1 cy)

44--Commanding General, Air Force Weapons Laboratory, Kirtland Air Force Base, New Mexico (1 cy)

45--President, U. S. Army Armor Board, ATTN: STEDD-GT, Fort Knox, Kentucky 40120 (1 cy)

46--Commanding General, Deseret Test Center, ATTN: Technical Library, Fort Douglas, Utah 84113 (1 cy)

47--Commanding Officer, U. S. Army Electronics Research and Development Activity (Arizona), Fort Huachuca, Arizona 85613 (1 cy)

48--Chief, National Military Command System Support Center, Pentagon, BE 685, ATTN: Technical Library, Washington 30201 (1 cy)

49--Commandant, U. S. Army War College, ATTN: Library M-1719, Carlisle Barracks, Pennsylvania 17013 (1 cy)

50--Commanding General, 1st Logistical Command, Fort Hood, Texas 76545 (1 cy)

51--Commanding General, 2d Logistical Command, APO San Francisco 96248 (1 cy)

52--Commanding General, 3d Logistical Command, APO New York 09058 (1 cy)

53--Commanding General, 4th Logistical Command, Fort Lee, Virginia 23801 (1 cy)

54--Commanding General, 5th Logistical Command, Fort Bragg, North Carolina 28307 (1 cy)

55--Commanding General, 7th Logistical Command and Eighth US Army Rear, APO San Francisco 96302 (1 cy)

56--Commanding General, 8th Logistical Command, APO New York 09019 (1 cy)

57--Commanding General, 9th Logistical Command, APO San Francisco 96233 (1 cy)